

Doctorate Project

**Comprehensive Autism Treatment, Resource, and Support Centers:  
A Holistic, Family-Centered Approach to the Treatment of Autism**

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ARCH 548, Fall 2011  
December 2011

*Submitted towards the fulfillment of the requirements for the Doctor of Architecture degree.*

School of Architecture  
University of Hawai'i

**Doctorate Project Committee**

Joyce Noe, Chairperson  
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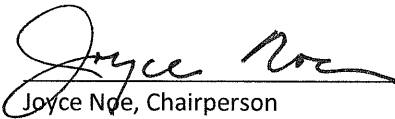
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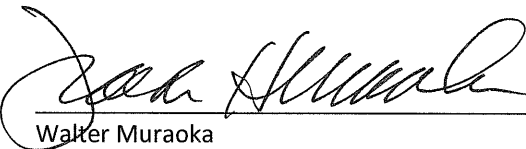
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*We certify that we have read this Doctorate Project and that, in our opinion, it is satisfactory in scope and quality in partial fulfillment for the degree of Doctor of Architecture in the School of Architecture, University of Hawai'i at Mānoa.*

Doctorate Project Committee

  
Joyce Nge, Chairperson

  
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*For my wife, Lori,  
and our two beautiful children, Ashley and Alex*

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# Table of Contents

<b>List of Figures and Tables</b>	<b>vii</b>
<b>Abbreviations</b>	<b>x</b>
<b>Abstract</b>	<b>xiii</b>
<b>Introduction</b>	<b>1</b>
<b><u>Chapter 1: Background</u></b>	<b><u>7</u></b>
What is Autism?	7
Why is Autism an Important Issue?	10
What Happens When a Diagnosis is Received?	16
Treatment Options	19
Resources/Support Services	38
Implications for a Comprehensive Autism Treatment, Resource, & Support Center	41
<b><u>Chapter 2: Project Statement</u></b>	<b><u>45</u></b>
<b><u>Chapter 3: Existing Facilities</u></b>	<b><u>48</u></b>
The MIND Institute	48
Hope Network's Center for Autism	52
Kids Institute for Development and Advancement (KiDA)	54
Integrative Hyperbaric Centers	57
The Rimland Center for Integrative Medicine	58
National Autism Center	60
Holland Center	61
Lakeside Center for Autism	62
<b><u>Chapter 4: Case Studies</u></b>	<b><u>67</u></b>
Cancer Treatment Centers of America	67
National Intrepid Center of Excellence (NICoE)	76
A Local Family Affected by Autism	85
<b><u>Chapter 5: Designing for Autism</u></b>	<b><u>99</u></b>

<b>Chapter 6: Qualitative Research Results</b>	<b>114</b>
Autism Facilities Survey	114
Site Visits/Interviews	134
<b>Chapter 7: Planning/Programming Criteria Guide</b>	<b>143</b>
Introduction	143
Planning/Programming Criteria Guide	144
Planning and Programming Criteria Guide for Autism Treatment, Resource and Support Centers	146
<b>Chapter 8: Example Project</b>	<b>200</b>
Site Information	200
Planning and Programming Using the Criteria Guide	208
Conceptual Design	227
Cost Estimate	244
<b>Chapter 9: Conclusion</b>	<b>246</b>
Appendix A – Autism Organizations	251
Appendix B – Hawaii Resource Guide	253
Appendix C – Design Firms with Experience Designing for Autism	260
Bibliography	261

## List of Figures and Tables

### **Figures**

Figure 1.1: The ASD Umbrella	8
Figure 1.2: DSM-IV Criteria for Autistic Disorder	9
Figure 1.3: Increase in Autism Prevalence, 2002 to 2006	11
Figure 1.4: Increase in Autism Prevalence since the 1970s	12
Figure 1.5: Number of Students with Autism in Hawaii, 1992-2009	13
Figure 1.6: Lifetime Costs of Autism	15
Figure 1.7: TACA Journey Guide – Year One	18
Figure 1.8: Discrete Trial Training	21
Figure 1.9: Floortime	25
Figure 1.10: Hard Chamber Hyperbaric Oxygen Therapy	35
Figure 1.11: Soft Chamber Hyperbaric Oxygen Therapy	36
Figure 1.12: Music Therapy Session	37
Figure 1.13: Children’s Barber Shop (Pigtails & Crewcuts, Honolulu, HI)	44
Figure 3.1: The MIND Institute, Sacramento, California	50
Figure 3.2: The MIND Institute, Waiting Area	51
Figure 3.3: The MIND Institute, Assessment Room	51
Figure 3.4: Hope Network Center for Autism Gymnasium and Motor Sensory Room	53
Figure 3.5: Hope Network Center for Autism Diagnostic Playroom and Model Living Unit	53
Figure 3.6: Hope Network Center for Autism Multi-Disciplinary Treatment Room and Family Therapy Room	54
Figure 3.7: Kids Institute for Development and Advancement Rock Climbing Wall in Sensory Gym and Classroom	56
Figure 3.8: Kids Institute for Development and Advancement Full Kitchen and Parent Lounge	56
Figure 3.9: Wisconsin Integrative Hyperbaric Center	57
Figure 3.10: The Rimland Center for Integrative Medicine	59
Figure 3.11: The Lakeside Center for Autism	63
Figure 4.1: Patient Empowerment Medicine	69
Figure 4.2: Patient Empowered Care	71
Figure 4.3: Breast Cancer Survival Rate Comparison	72
Figure 4.4: Prostate Cancer Survival Rate Comparison	73
Figure 4.5: Cancer Treatment Center of America, Tulsa, Oklahoma	75
Figure 4.6: Central Park	80

Figure 4.7: Patient/Family Respite Areas – Café with Internet Access; Lounge with Reading Area	81
Figure 4.8: Music and Art Therapy Room	81
Figure 4.9: Lighting Strategies for the Sensory Impaired	82
Figure 4.10: NiCoE, Main Entrance	84
Figure 4.11: Services on Oahu Accessed by the Smith Family	97
Figure 6.1: Profile of Respondents	119
Figure 6.2: Degree of Inconvenience	120
Figure 6.3: Distance Willing to Travel	121
Figure 6.4: Co-located Autism Services Beneficial?	122
Figure 6.5: Rooms/Spaces Sorted by Average Score	128
(Planning & Programming Criteria Guide, from Chapter 7)	
Figure 1: Functional Relationships of the Educational Area (p. 10)	155
Figure 2: Functional Relationships of Primary Care Clinic (p. 13)	158
Figure 3: Functional Relationships of Occupational Therapy (p. 14)	159
Figure 4: Functional Relationships of Physical Therapy (p. 15)	160
Figure 5: Functional Relationships of Compounding Pharmacy (p. 17)	162
Figure 6: Functional Relationships of Clinical Laboratory (p. 19)	164
Figure 7: General Functional Relationships of Diagnostic Imaging (p. 21)	166
Figure 8: Detailed Functional Relationships of Diagnostic Imaging (p. 22)	167
Figure 9: Functional Relationships of Hyperbaric Oxygen Therapy (p. 23)	168
Figure 10: Functional Relationships of Support Spaces (p. 26)	171
Figure 11: Basic Functional Relationships (p. 28)	173
Figure 12: Expanded Functional Relationships (p. 29)	174
Figure 13: Detailed Functional Relationships (p. 30)	175
Figure 14: Functional Relationships of Educational Area (p. 32)	177
Figure 15: Functional Relationships of Clinical Area (p. 33)	178
Figure 16: Screen Shot of Input Tab (p. 34)	179
Figure 17: Screen Shot of Educational Tab (p. 35)	180
Figure 18: Screen Shot of Summary Tab (p. 36)	181
Figure 8.1: Koa Ridge Plan	201
Figure 8.2: Conceptual Site Plan	202
Figure 8.3: Proposed Site for the Koa Ridge ATRSC	203
Figure 8.4: View Towards the Waianae Mountains	204
Figure 8.5: View Towards the Waianae Mountains	205
Figure 8.6: View Across Ka Uka Boulevard	205
Figure 8.7: Site Considerations	206
Figure 8.8: Koa Ridge Primary Service Area	213
Figure 8.9: Basic Functional Relationships	227

Figure 8.10: Basic Functional Relationships applied to the Koa Ridge Site	228
Figure 8.11: Expanded Functional Relationships	229
Figure 8.12: Schematic Site Plan	229

## Tables

Table 3.1: Comparative Services	66
Table 5.1: Autism Design Characteristic References	112
Table 6.1: Summary of Question 5 Responses	123
Table 6.2: Rooms/Spaces Sorted by Most Common Response	124
Table 6.3: Most Common Response of Parents and “All Others”	126
Table 8.1: Number of Students Ages 3-8 by Disability in Special Education, 2009	209
Table 8.2: Estimated Number of Students Ages 3-8 by Disability in Special Education, 2010	210
Table 8.3: Current Estimated Number of Students with Autism Ages 3-8 in Special Education	211
Table 8.4: Current Estimated Number of Students with Autism Ages 0-8 in Hawaii	212
Table 8.5: Current Estimated Number of Students with Autism Ages 0-8 in the Koa Ridge Primary Service Area	214
Table 8.6: Estimated Enrollment of Students with Autism Ages 0-8 in the Koa Ridge ATRSC	216

## **Abbreviations**

ABA	Applied Behavior Analysis
A-B-C	Antecedent-Behavior-Consequence Analysis
ADHD	Attention Deficit/Hyperactivity Disorder
ARI	Autism Research Institute
ASD	Autism Spectrum Disorders
ATRSC	Autism Treatment, Resource, and Support Center
AVB	Applied Verbal Behavior
BISS	Behavior Intervention Support Specialist
CARD	Center for Autism and Related Disorders
CDC	Centers for Disease Control and Prevention
CPI	Crisis Prevention Intervention
CTCA	Cancer Treatment Centers of America
DAN!	Defeat Autism Now!
DIR	Developmental Individual Difference Relation-Based Intervention
DOE	Department of Education
DOH	Department of Health
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders
DTT	Discrete Trial Training
FAPE	Free and Appropriate Public Education
FBA	Functional Behavior Assessment

fMRI	Functional Magnetic Resonance Imaging
FTE	Full-Time Equivalent
GFCF	Gluten Free/Casein Free
HBOT	Hyperbaric Oxygen Therapy
HVAC	Heating, Ventilation, and Air Conditioning
IDEA	Individuals with Disabilities Education Act
IEP	Individualized Education Plan
NICoE	National Intrepid Center of Excellence
OT	Occupational Therapy
PAC	Pacific Autism Center
PDD	Pervasive Developmental Disorder
PDD-NOS	Pervasive Developmental Disorder-Not Otherwise Specified
PECS	Picture Exchange Communication System
PRT	Pivotal Response Training
PT	Physical Therapy
PTSD	Post-Traumatic Stress Disorder
RDI	Relationship Development Intervention
SCD	Specific Carbohydrate Diet
SCERTS	Social Communication Emotional Regulation Transactional Support Model
SEER	Surveillance, Epidemiology, and End Results Program
SF	Square Feet

SIB	Self-Injurious Behavior
SPECT	Single-Photon Emission Computed Tomography
TACA	Talk About Curing Autism
TBI	Traumatic Brain Injury
TEACCH	Treatment and Education of Autistic and Communication related handicapped Children
VOC	Volatile Organic Compound



## **ABSTRACT**

This report provides criteria and guidance for the planning and programming of comprehensive Autism Treatment, Resource, and Support Centers (ATRSCs), with the goal of providing a new, synergistic approach to the treatment of autism that is based on a holistic, family-centered model of care, in order to improve outcomes for patients and families. A combined research methodology is used to state the case for these facilities. Background on autism, treatments, support services, and existing facilities is provided. Historical and qualitative data are analyzed to develop the criteria, and a facility design is provided to show a sample of the application of the criteria. Additional resources are provided in the Appendices. This report is intended to provide a tool to the design and construction industry for the development of autism treatment facilities.

## **INTRODUCTION**

*"This autism supercenter would be like the Wal-Mart of autism facilities . . ."*<sup>1</sup>

- Bonnie Sayers, BellaOnline

For the past 25 years, I have engaged in the design and construction of medical facilities for the United States Air Force. In December of 2006, less than a month before his second birthday, my son was diagnosed with autism. As an architect and the parent of a child with autism, when the opportunity presented itself to pursue a doctoral degree, the subject of my dissertation didn't require much thought: a facility for autism.

In December 2009, the Centers for Disease Control and Prevention issued a report estimating that autism affects 1 in every 110 children today (1 in 70 boys), making it more common than childhood cancer, juvenile diabetes, and pediatric AIDS combined.<sup>2</sup> Approximately 1.5 million individuals in the U.S. and tens of millions worldwide are affected. And the prevalence of autism is increasing 10-17% annually.<sup>3</sup> The Autism Society estimates that the lifetime cost of caring for a child with autism ranges from \$3.5 million to \$5M million, and that the United States is facing \$90 billion annually in costs for autism.<sup>4</sup>

Given this epidemic-like growth of autism spectrum disorder (ASD) cases over the past several years, the enormous costs associated with the treatment of autism, and

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<sup>1</sup> Bonnie Sayers, "Autism Super Centers," <http://www.bellaonline.com/articles/art39696.asp> (accessed April 1, 2011).

<sup>2</sup> Centers for Disease Control and Prevention, "Prevalence of Autism Spectrum Disorders – Autism and Developmental Disabilities Monitoring Network, United States, 2006," <http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5810a1.htm> (accessed February 1, 2011).

<sup>3</sup> Autism Speaks, "What is Autism?" <http://www.autismspeaks.org/whatisit/index.php> (accessed February 15, 2011).

<sup>4</sup> Autism Society, "About Autism," <http://www.autism-society.org/about-autism/> (accessed February 2, 2011).

the difficulties faced by families in accessing services, opportunities exist to consider how to serve these individuals and families facing a lifetime of supports. A specific opportunity poses a challenge to the architectural profession – that of providing appropriate facilities in response to the autism epidemic. There are a multitude of services and supports that are available to individuals with ASD and their families, most of which are scattered about in facilities that are set up for their particular market niche, be it educational, clinical, or support related. This forces families to spend an inordinate amount of time coordinating care, and traveling to and from various service locations. If all of these services were offered in one location, it would not only be more convenient for the families, but could have the synergistic effect of creating new approaches to the overall treatment of autism.

The intent of this doctoral project is to develop planning and programming guidance for comprehensive Autism Treatment, Resource, and Support Centers (ATRSCs) that can accommodate the full range of needs for people with autism and their families. Working within the primary categories of educational, clinical, and support services, the intent is to provide a tool that sets forth the criteria and guidance for all of the potential functions that an ATRSC could include. This will allow a client or developer to plan and program the appropriate functions that might be included in a particular project (given the various restraints of budget, staffing, available land, etc.), as well as to inform the design process for such facilities. In addition, it explores how offering comprehensive services in the form of an ATRSC can provide a new, synergistic

approach to the treatment of autism that is based on a holistic, family-centered model of care, thereby improving outcomes for patients and their families.

The primary audience for this report is professionals in the design and construction industry, including architects, contractors, developers, and owner representatives. These are the people who will have to respond to the demand for the type of facility represented by an ATRSC. Ultimately, the document serves as a guide to the architectural profession for the design of appropriate and functional facilities intended to support the autism community. It is, in some respects, a “call to action” to the profession to address an issue that is of great importance to society.

The need for this type of criteria and guidance is clear, and will only become more pressing as the prevalence of autism increases. The architectural community will be faced with increasing numbers of clients that demand facilities that offer comprehensive services for autism, and we must respond, because this type of facility does not currently exist.

### ***Research Methodology***

This report uses a combined research methodology to state the case for ATRSCs. Historical background is provided to document the development of educational, clinical, and support facilities that have been built to date. This serves to highlight the void in the field – specifically that so-called “one-stop shopping” for autism services falls well short of the comprehensive services that individuals with autism and their families need. Case-studies are presented to offer useful comparisons with the treatment

approaches to cancer and traumatic brain injury, and how these treatment methods were influenced by the environments in which they were delivered. Through the use of various qualitative methods (surveys, site visits, personal interviews), the basis of the programming/planning document was developed, in response to the needs of families, doctors, educators, and other caregivers. Overall, the underlying research methodology is that of logical argumentation, because without actually building an ATRSC, it cannot be proven that they would be successful. The logical argument is made that the functions inherent in an ATRSC form a coherent whole, and when combined together, provide a much more holistic, effective solution to autism treatment and services (the sum being greater than the parts).

### ***Organization of this Report***

The first section of this report defines autism; what it is, and why it is such an important issue. It also addresses the various treatment options, as well as resources and supports that are available to individuals and families. This provides not only the background information required to give the reader an understanding of autism, and the challenges faced by these individuals and their families, but also serves as the basis to identify the treatment spaces, or functions, that are candidates for inclusion in a comprehensive Autism Treatment, Resource, and Support Center.

The following section examines several of the more notable autism treatment facilities in the U.S. today, the so-called “one-stop shops” for autism services that

currently exist. This includes an analysis of both the services offered, as well as the facilities they are offered in.

The third section presents several case studies. First, case studies are presented of treatment facilities for other medical conditions; specifically, cancer and traumatic brain injury. These case studies offer examples of how holistic healing approaches have improved outcomes for these patients, and offer models of care that can be emulated for the treatment of autism. Following that is a case study of a single family affected by autism. This examines both the positive and negative aspects of their unique experience – their overall approach to treating their child, the services and supports they have used, and what they feel should be included in autism facilities.

The next section, “Designing for Autism,” assesses the current trends that apply to the design of individual spaces that might be included in an ATRSC, such as finishes, lighting, acoustics, etc. This provides information that architects can use as guidelines during the design process.

The primary research data is covered in the next section. The results of the qualitative analysis conducted through surveys, site visits, and interviews is presented, reviewed, and analyzed. Conclusions are then drawn from the data and applied towards the development of the ATRSC planning/programming guide.

Based on the body of research, the actual planning/programming guidance is set forth as the primary product of this report. This section defines the spaces, their sizes and characteristics, and the functional relationships between them. It presents a tool

that can be used to develop the space program for a new facility, based on demand/workload and staffing.

The next section provides an example of a conceptual facility design based on the criteria set forth in the previous section. This provides a practical sample of the application of the guidance. Included at the end of this section is a cost estimate for the example facility.

It should be noted that the type of comprehensive facilities being described and recommended in this report are intended primarily for early intervention in the treatment of children with autism. The goal of autism treatment programs are to eventually mainstream these individuals into regular classrooms with their non-disabled peers, and to teach them to function independently in order to lead productive lives as adults. While on-going medical treatments for the individual and support services for the entire family may continue for years, behavioral interventions in a non-inclusive environment are generally appropriate only until the child is able to move into a regular classroom, typically with supports at first. That being said, I feel that entering the lobby of an ATRSC should provide an appropriate “first-step” for families beginning the autism journey. It can provide the answer to the question “*What do we do now?*” when parents receive the news that their child has been diagnosed with autism.

## **CHAPTER 1: BACKGROUND**

*“When you’ve seen one child with autism, you’ve seen one child with autism.  
No two children on the autism spectrum have the same needs.”*

- Brenda Smith-Myles, Autism Society of America

This section provides information on the condition of autism, why it is a critical issue facing society today, the most common treatment options, and the resources and support services available to the family living with autism. Based on this information, the implications for a comprehensive autism treatment, resource, and support center (in terms of rooms and functions) are explored.

### ***What is Autism?***

Autism is a condition affecting the processing, integrating, and organizing of information that significantly impacts communication, social interaction, functional skills, and educational performance.<sup>5</sup> It is a neurological and biological disorder that may preclude the body from receiving signals transmitted by the brain, resulting in misfires and disconnects. Individuals with autism have been clinically characterized as intentionally withdrawn and lacking in social reciprocity due to their communication difficulties or seeming disregard for social norms, as demonstrated through repetitive actions such as hand flapping.<sup>6</sup> To be diagnosed with autism, children must have difficulty socially interacting with others; they must have impairments in communication; and they must also show restricted interests.<sup>7</sup>

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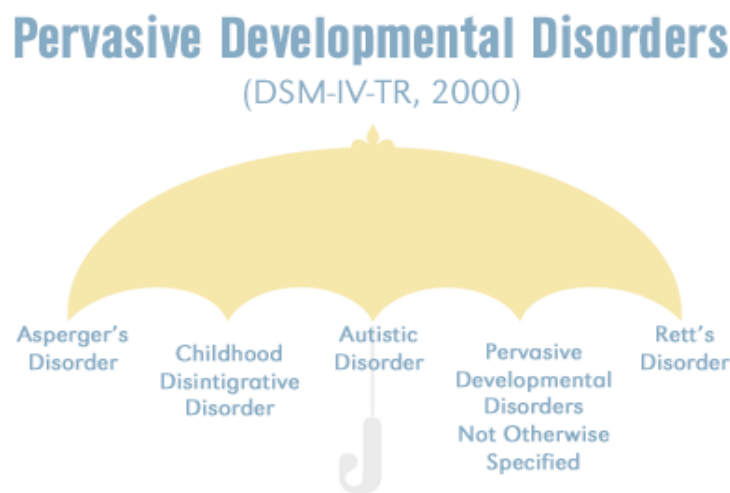
<sup>5</sup> Tilton, Adelle Jameson, *The Everything Parent’s Guide to Children with Autism* (Avon, MA: F+W Publications, Inc., 2004), v.

<sup>6</sup> Stillman, William, *The Autism Answer Book* (Naperville, IL: Sourcebooks, Inc., 2007), 2.

<sup>7</sup> Koegel, Lynn Kern, and Claire LaZebnik, *Overcoming Autism* (New York: Penguin Group, Inc., 2004), 2.



Autism (or Autistic Disorder) is the most prevalent of a group of related conditions commonly referred to as Autism Spectrum Disorders (ASD). Clinically, ASDs are referred to as Pervasive Developmental Disorders (PDD). Included under the ASD/PDD umbrella are Asperger's Disorder/Syndrome, Childhood Disintegrative Disorder, Autistic Disorder, Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS), and Rett's Disorder/Syndrome. PDD-NOS is a catch-all category for people with some autistic symptoms, but that don't fit into any of the other categories.<sup>8</sup>



*Figure 1.1: The ASD "Umbrella"<sup>9</sup>*

A diagnosis of autism is generally based on the criteria outlined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), published by the American Psychiatric Association. The criteria for Autistic Disorder, 299.00, is shown in Figure 1.2. There is separate criteria for the other disorders on the spectrum.

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<sup>8</sup> Shore, Steven M., and Linda G. Rastelli, *Understanding Autism for Dummies* (Hoboken, NJ: Wiley Publishing, Inc., 2006), 30.

<sup>9</sup> University of Nebraska-Lincoln, "Nebraska Autism Spectrum Disorders Network; Autism 101 (View)," [http://www.unl.edu/asdnetwork/autism\\_101.shtml#view](http://www.unl.edu/asdnetwork/autism_101.shtml#view) (accessed February 15, 2011).

**DSM-IV**  
**Diagnostic Criteria for 299.00 Autistic Disorder**

- A. A total of six (or more) items from (1), (2), and (3), with at least two from (1), and one from (2) and (3):
- (1) qualitative impairment in social interaction, as manifested by at least two of the following:
    - (a) marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction
    - (b) failure to develop peer relationships appropriate to developmental level
    - (c) a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g. by a lack of showing, bringing, or pointing out objects of interest)
    - (d) lack of social or emotional reciprocity
  - (2) qualitative impairments in communication as manifested by at least one of the following:
    - (a) delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gestures or mime)
    - (b) in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others
    - (c) stereotyped or repetitive use of language or idiosyncratic language
    - (d) lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level
  - (3) restricted repetitive and stereotyped patterns of behavior, interests and activities, as manifested by at least one of the following:
    - (a) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
    - (b) apparently inflexible adherence to specific, nonfunctional routines or rituals
    - (c) stereotyped or repetitive motor mannerisms (e.g. hand or finger flapping or twisting, or complex whole-body movements)
    - (d) persistent preoccupation with parts of objects
- B. Delays or abnormal functioning in a least one of the following areas, with onset prior to age 3 years: (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play.
- C. The disturbance is not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder.

*Figure 1.2: DSM-IV Criteria for Autistic Disorder*<sup>10</sup>

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<sup>10</sup> Centers for Disease Control and Prevention, "Autism Spectrum Disorders (ASDs)," <http://www.cdc.gov/ncbddd/autism/hcp-dsm.html> (accessed February 15, 2011).

Children with autism often express the following signs and symptoms that characterize all autism spectrum disorders to a great degree:<sup>11</sup>

- Expressive and receptive communication and social deficits.
- Insistence on routine and resistance to change.
- Appearing to be “off in their own world.”
- Resistance to physical closeness such as hugging.
- Attachment to “odd” toys such as kitchen utensils.
- Parallel play (playing beside other children rather than interacting with them).
- Lack of imaginative play.
- Sudden and apparently unexplainable anger and tantrums.
- Repetitive behaviors.
- Splinter skills (excelling in a particular skill that is above the apparent IQ level).
- Appearing to have sensory overload in normal environments.
- Little or no eye contact.

The most challenging aspect of autism is that each individual presents a unique set of symptoms. Therefore, there is no standard treatment; a treatment program must be tailored to each patient based on his or her symptoms and potential responsiveness to various therapies. This can involve a great deal of trial-and-error, as the family tries to coordinate with the multitude of educational and medical specialists that represent the various treatment options that exist.

### ***Why is Autism an Important Issue?***

Some of the more notable statistics regarding autism were pointed out in the introduction to this report, and further analysis paints a clear picture as to why autism is one of the most pressing issues facing society today. The December 2009 report from the Centers for Disease Control and Prevention (CDC) put the prevalence of autism (to

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<sup>11</sup> Tilton, 3.

include Asperger's Disorder and PDD-NOS) at 1 in every 110 in the United States, based on data collected in 2006. This represents a 57% increase from their previous study, published in 2007 and based on data collected in 2002.<sup>12</sup> That's a *57% increase in four years!* It is probably safe to assume that the prevalence is even higher today.

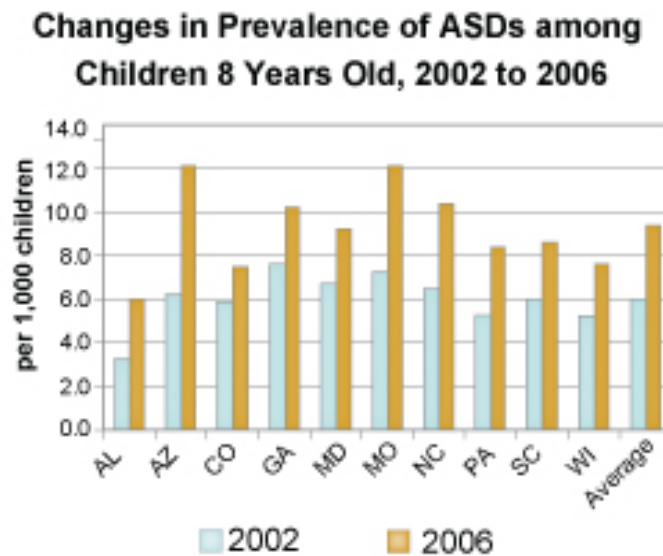


Figure 1.3: Increase in Autism Prevalence, 2002 to 2006<sup>13</sup>

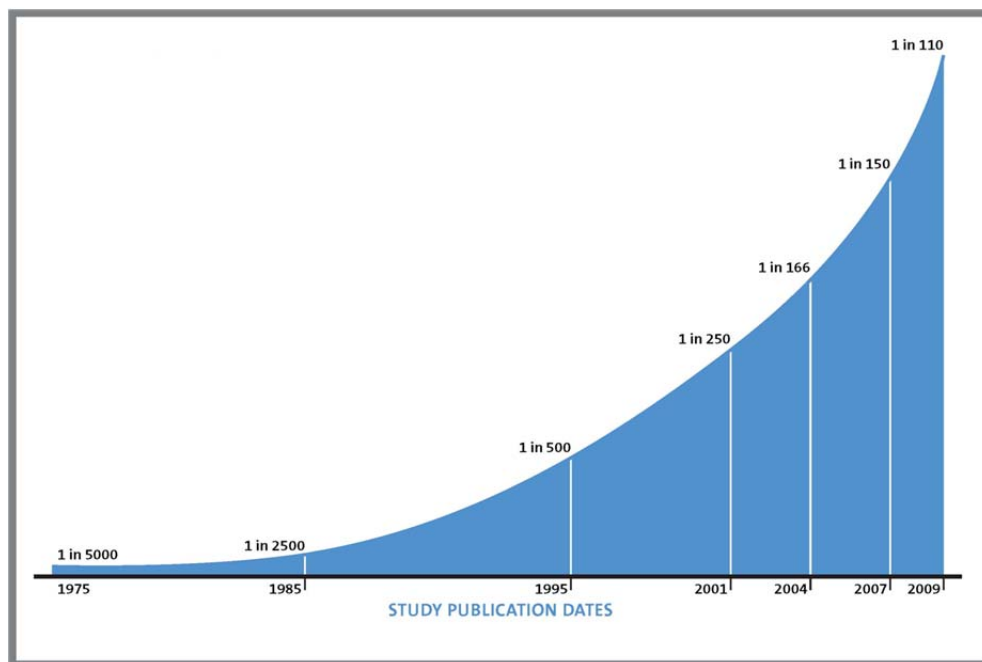
A separate study, published in November 2009, found that 1 in 91, or an estimated 673,000 children aged 3-17 in the United States had an autism spectrum disorder.<sup>14</sup>

<sup>12</sup> Centers for Disease Control and Prevention, "Prevalence of Autism Spectrum Disorders – Autism and Developmental Disabilities Monitoring Network, United States, 2006," <http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5810a1.htm> (accessed February 1, 2011).

<sup>13</sup> Centers for Disease Control and Prevention, "Autism Spectrum Disorders (ASDs) – Data and Statistics," <http://www.cdc.gov/ncbddd/autism/data.html> (accessed February 15, 2011).

<sup>14</sup> Michael D. Kogan, et al, "Prevalence of Parent-Reported Diagnosis of Autism Spectrum Disorder Among Children in the US, 2007," *Pediatrics*, Nov 2009; 124: 1395-1403.

When we look back further, the rise in autism is even more dramatic. Autism was estimated to affect 1 in 5,000 in the 1970s. However, the rates began to rise sharply after that, and continue to increase exponentially. While some of this increase can be attributed to changes in diagnostic criteria, better reporting of cases through increased awareness, and even an increase in parental age,<sup>15</sup> the rise in prevalence is so meteoric that the 2009 CDC report stated “ . . . the need to regard ASDs as an urgent public health concern.” Autism has reached epidemic proportions, and must be treated as the “urgent” matter it has become.



*Figure 1.4: Increase in Autism Prevalence since the 1970s<sup>16</sup>*

<sup>15</sup> Autism Speaks Official Blog, “What is Causing the Increase in Autism Prevalence?” <http://blog.autismspeaks.org/2010/10/22/got-questions-answers-to-your-questions-from-the-autism-speaks%E2%80%99science-staff-2/> (accessed February 4, 2011).

<sup>16</sup> Autism Speaks, “Top Ten Research Achievements of 2009,” [http://www.autismspeaks.org/science/science\\_news/top\\_ten\\_autism\\_research\\_events\\_2009\\_main.php](http://www.autismspeaks.org/science/science_news/top_ten_autism_research_events_2009_main.php) (accessed February 16, 2011).

Similar trends can be seen in Hawaii. Data are collected by the Department of Education on children with disabilities, ages 3-21 (ages 6-21 from 1992-1999), who receive special education services. These figures are reported by the State of Hawaii in accordance with Section 618 of the Individuals with Disabilities Education Act (IDEA) to the U.S. Department of Education, Office of Special Education Programs. Based on these reports, the number of students in Hawaii with autism increased by 1,666% from 1992 to 2009 (from 59 cases to 1,268 cases).<sup>17</sup>

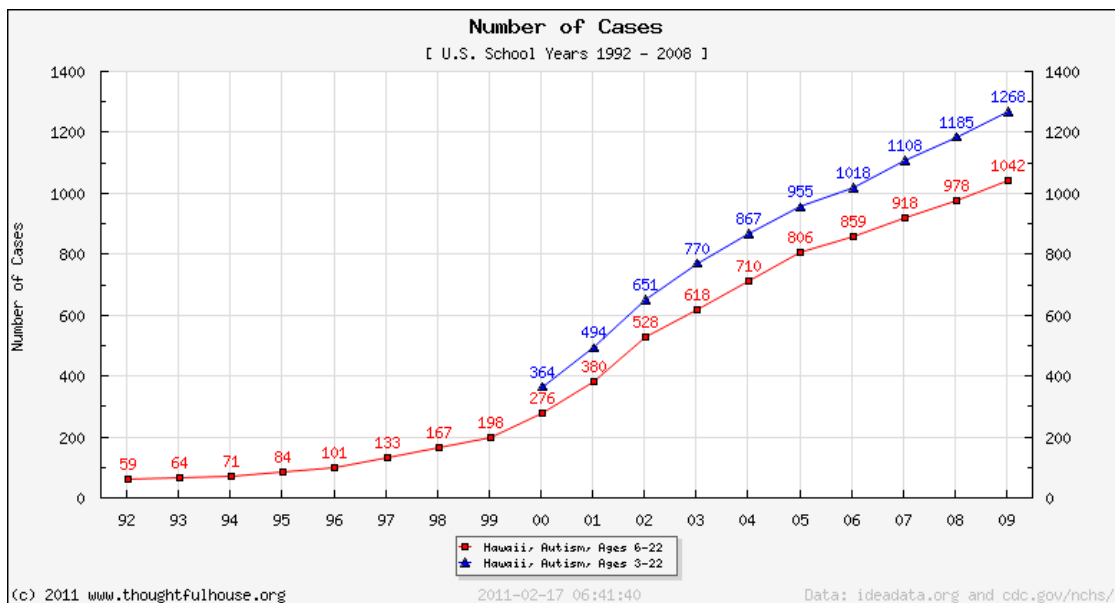


Figure 1.5: Number of Students with Autism in Hawaii, 1992-2009<sup>18</sup>

<sup>17</sup> Hawaii Department of Education, "IDEA Part B Data Reports," [http://downloads.k12.hi.us/specialeducation/idea\\_part\\_b\\_data\\_reports/09-10/01ChildCountPtB5-2009rev.pdf](http://downloads.k12.hi.us/specialeducation/idea_part_b_data_reports/09-10/01ChildCountPtB5-2009rev.pdf) (accessed February 17, 2011); Thoughtful House Center for Children, "Autism – Statistics, Incidence, Prevalence, Rates," <http://www.thoughtfulhouse.org/tech-labs/disabilities/autism.php?s=HI> (accessed February 17, 2011).

<sup>18</sup> Thoughtful House Center for Children, "Autism – Statistics, Incidence, Prevalence, Rates," <http://www.thoughtfulhouse.org/tech-labs/disabilities/autism.php?s=HI> (accessed February 17, 2011).

So as an “urgent public health concern,” how does autism compare to other childhood disorders and disabilities? As previously stated, it is more common than childhood cancer, juvenile diabetes, and pediatric AIDS combined. And it is the fastest growing serious developmental disability in the United States.<sup>19</sup>

However, despite these facts, autism receives comparatively little funding. Consider the following numbers:<sup>20</sup>

<u>Disorder</u>	<u>Prevalence</u>	<u>Private Funding</u>
Leukemia	1 in 1,200	\$277 million
Muscular Dystrophy	1 in 100,000	\$162 million
Pediatric Aids	1 in 300	\$394 million
Juvenile Diabetes	1 in 500	\$156 million
<b>Autism</b>	<b>1 in 110</b>	<b>\$79 million</b>

In 2009, the National Institutes of Health budget was \$35.9 billion. Of that amount, \$196 million went to autism research (0.5% of total NIH funding).<sup>21</sup>

It is clear that additional funding is required for autism, and this should be viewed as an up-front investment that will pay dividends over time, because many of the costs associated with this disorder are spent on caring for adults with autism – costs that could be reduced with early intervention and treatment. The Autism Society estimates that 60% of the costs of autism are in adult services.<sup>22</sup> A 2007 study published in the *Archives of Pediatric and Adolescent Medicine* pegged the lifetime incremental

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<sup>19</sup> Autism Speaks, “Facts About Autism,” <http://www.autismspeaks.org/whatisit/facts.php> (accessed February 15, 2011) .

<sup>20</sup> Ibid.

<sup>21</sup> Ibid.

<sup>22</sup> Autism Society, “Facts and Statistics,” <http://www.autism-society.org/about-autism/facts-and-statistics.html> (accessed February 2, 2011).

society cost of autism at \$3.2 million per person, with lost productivity and adult care accounting for the largest components of these costs. This study considered direct medical costs (data on physician, outpatient, clinic services, dental care, prescription medications, complementary and alternative therapies, behavioral therapies, hospital and emergency services, allied health, equipment and supplies, home health, and medically related travel); direct non-medical costs (data on child care, adult care, respite and family care, home and care modifications, special education, supported employment, and other costs); and indirect costs (productivity losses for people with autism, and productivity losses for parents of children with autism). A summary of the data from this study is shown in Figure 1.6.

Age Group, y	Average Per Capita Cost per Age Group			Total Per Capita Cost
	Direct Medical	Direct Nonmedical	Indirect	
3-7	35 370	10 805	43 066	446 203
8-12	6013	15 708	41 138	314 297
13-17	5014	13 550	38 453	285 082
18-22	2879	10 720	36 090	248 446
23-27	1574	27 539	51 740	404 260
28-32	1454	23 755	35 757	304 828
33-37	1389	20 492	30 852	263 662
38-42	1283	17 676	29 132	240 457
43-47	1440	15 248	26 600	216 439
48-52	1447	13 152	24 531	195 650
53-57	1290	11 292	17 776	151 790
58-62	1218	9489	0	53 535
63-66	1027	7908	0	35 738
Total lifetime costs	305 956	978 761	1 875 667	3 160 384

\*Costs presented in 2003 dollars. Costs for age 4 years and older are discounted to 2003 dollars using a discount rate of 3%. Life expectancy for men is age 66 years and for women, age 65 years.

*Figure 1.6: Lifetime Costs of Autism<sup>23</sup>*

<sup>23</sup> Michael L. Ganz, "The Lifetime Distribution of the Incremental Societal Costs of Autism," *Archives of Pediatric and Adolescent Medicine*, 2007; 161:343-349.



### ***What Happens When a Diagnosis is Received?***

Receiving a diagnosis of autism for their child is obviously a devastating event for parents. Mothers and fathers typically react in different ways, but both can go through the emotional stages of denial, anger, depression, etc. It is important for the sake of the child and the family, however, that the “acceptance” stage be reached as soon as possible. That’s when the work begins – the research, the networking, finding doctors, and setting your child on the road to recovery. There are many tests and evaluations that must be done, and many treatment options available (which are discussed in the next section). This can be a daunting and oftentimes overwhelming task that places a great deal of stress on families.

If the child is diagnosed with autism prior to the age of 3, the family will be referred to the state’s early intervention program. In Hawaii, this falls under the Department of Health (DOH). The DOH typically contracts with service providers (such as Easter Seals) to work with the family and coordinate intervention services. Once the child reaches the age of 3, responsibility for their services is turned over to the Department of Education (DOE). In providing services for special needs students, the DOE must conform to the guidance in the Individuals with Disabilities Education Act (IDEA), by providing a free and appropriate public education (FAPE) that is *individualized* to the needs of each student. This is done through the Individualized Educational Plan (IEP) process. The DOE conducts their own assessments of the child, and then provides services based on the results. A child with autism will typically be placed in a special

education classroom, with a one-to-one aide (skills trainer) assigned to them.

Depending on the level of functioning, the child may be placed in a regular classroom, with specific supports to enable their participation. Services in both of these programs (DOH and DOE) include behavioral therapy, speech therapy, and occupational therapy. As will be evident in the next section, this represents only one aspect of the treatment of autism. The process of working with the DOE to obtain appropriate services for a child with special needs is beyond the scope of this report, but suffice it to say that it is a frustrating process at best, and often results in legal proceedings, known as due process hearings.

Talk About Curing Autism (TACA), a not-for-profit organization dedicated to providing information, resources, and support to families affected by autism, publishes the *Families With Autism Journey Guide—A Starting Point for Parents Facing Autism*. The “Autism Journey Year One” chart from this guide is shown in Figure 1.7, and gives a good indication of what a family faces when a diagnosis of autism is received. The goal is to decrease the amount of time between receiving a diagnosis and the implementation of effective treatments.<sup>24</sup>

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<sup>24</sup> Talk About Curing Autism, “Autism Journey Guide,” <http://www.talkaboutcuringautism.org/new-parents/autism-journey-guide.htm> (accessed February 17, 2011).

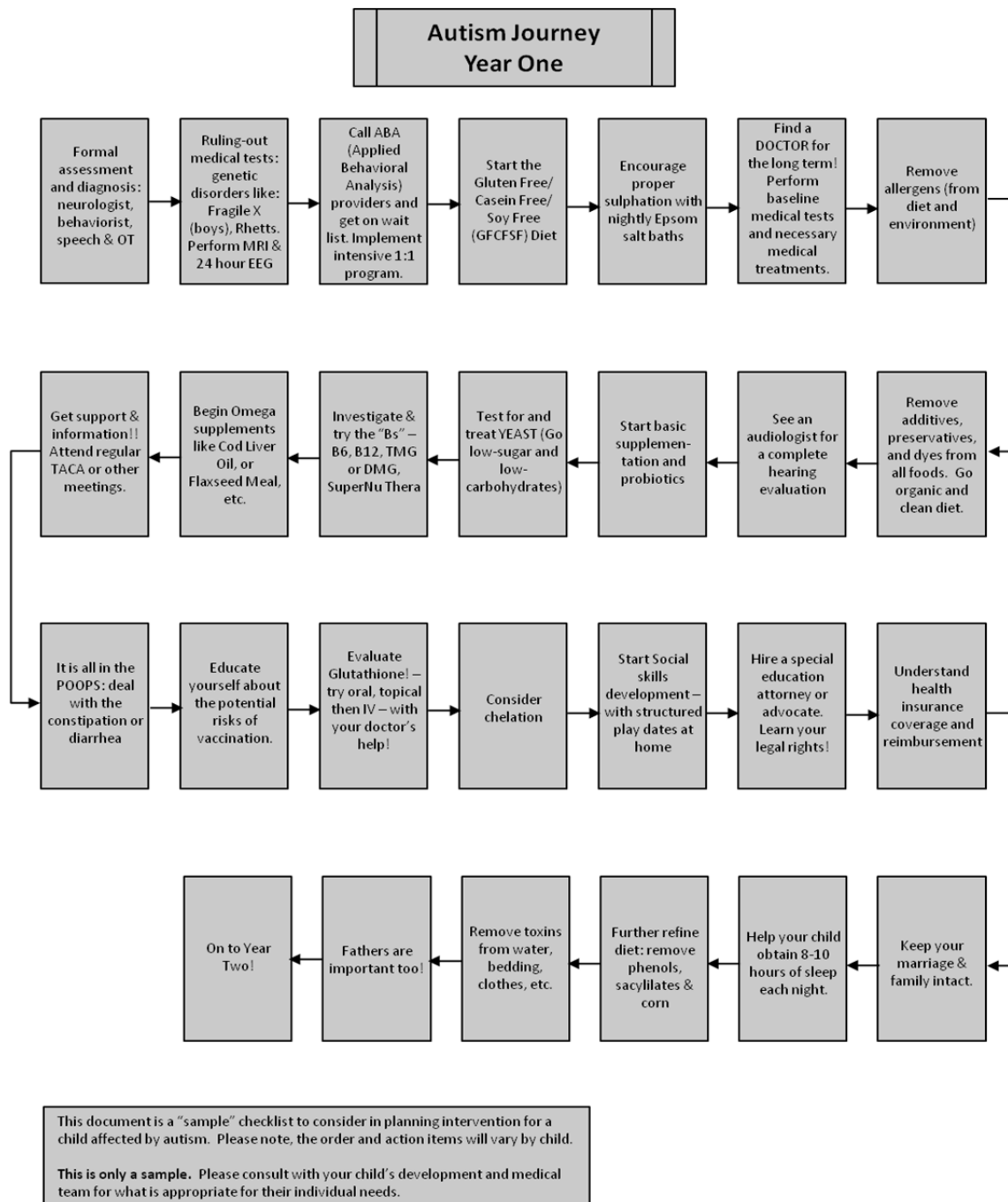


Figure 1.7: TACA Journey Guide – Year One<sup>25</sup>

<sup>25</sup> Talk About Curing Autism, "Families with Autism Journey Guide," (Costa Mesa, CA: Talk About Curing Autism, 2010), 42.

## ***Treatment Options***

Autism *is* treatable. Studies show that early diagnosis and intervention lead to significantly improved outcomes. And with the enormous growth in the prevalence of autism, there has been a commensurate growth in treatment options. Years ago, treatment protocols were based primarily on behavioral therapy, and this remains the predominant form of treatment today. Many of the more recent developments are still based on anecdotal evidence, but have nonetheless gained widespread acceptance among medical and educational professionals, as well as families. Treatment options can be categorized under the broad headings of educational, clinical (including biomedical treatments), nutritional, and “other,” which includes alternative, or complementary therapies. The listing below is by no means exhaustive, but represents the common treatments in use today.

**Educational.** This category includes the various modalities that one would find in a specialized school for autism, or that might be practiced in the special education classroom of a typical school. These approaches are based on the theories of behavioral therapy. The most common of these are discussed below.

*Applied Behavior Analysis (ABA).* ABA is the systematic application of behavioral principles to change socially significant behavior to a meaningful degree. Research tools enable users of these principles to verify a functional relation between a behavior and

an intervention.<sup>26</sup> ABA uses Functional Behavior Assessments (FBA), based on antecedent-behavior-consequence (A-B-C) analysis, to create opportunities for students to learn and acquire skills, while minimizing undesired behaviors, through the use of reinforcers. Reinforcers reward a proper response, and may be verbal (e.g. “Great job!”) or tangible (e.g. a preferred toy or food item). Criteria for success is measured in terms of desired versus non-desired responses of the child. ABA is typically delivered in a one-to-one setting by a skills trainer, and 25-40 hours a week of therapy sessions is generally recommended.<sup>27</sup>

ABA is considered a scientific method of behavior intervention because a significant amount of research has been conducted that validates its procedures of improved behavior in children with autism.<sup>28</sup> It is generally considered the only “proven” method for autism intervention, a point that providers of traditional ABA programs like to make when marketing their services. However, many of the other behavioral interventions for autism are based on basic ABA principles, and are simply variations in the application of those principles.

In the 1960s, O. Ivaar Lovaas, a professor in the UCLA Psychology Department, developed a specific technique of ABA for use with autistic children. This is known as Discrete Trial Training (DTT), and is an intensive repetition of tasks and lessons that

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<sup>26</sup> Alberto, P.A., & Troutman, A.C., *Applied Behavior Analysis for Teachers* (Upper Saddle River, NJ: Pearson Education, Inc., 2009), 423.

<sup>27</sup> Stillman, 154-5.

<sup>28</sup> Ibid., 155.

reinforce positive responses and negate non-compliant ones.<sup>29</sup> Often referred to as “table time,” it consists of the therapist sitting at the table with the student and, for example, asking them to identify a particular object. The child must answer correctly ten consecutive times before that item is considered mastered. DTT is often the first phase of an ABA program.



*Figure 1.8: Discrete Trial Training<sup>30</sup>*

Applied Verbal Behavior (AVB). AVB is an approach to ABA that stresses language development. AVB teaches students to imitate, follow instructions, match, and make requests. The rationale behind AVB is that language is the foundation for

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<sup>29</sup> Ibid.

<sup>30</sup> Children’s Care, “Our Services,” <http://www.cchs.org/services/ibt> (accessed February 10, 2011).

many other skills; therefore, by teaching language first, other skills are easier to acquire.<sup>31</sup>

AVB was first developed in the 1950s by behaviorist B.F. Skinner. The technique emphasizes repetition and the use of rewards to reinforce desired behavior. Skinner believed that in order for children to communicate, they must learn the functional units of language. Skinner identified these units as imitative speech (echoics); how to request or obtain what one wants (mands); developing a vocabulary for what is in the environment (tacts); and engaging in conversational language (intraverbals).<sup>32</sup>

Pivotal Response Training (PRT). PRT was developed by Doctors Robert and Lynn Koegel, cofounders of the Autism Research Center at the University of California-Santa Barbara. PRT expands upon the principles of ABA. In PRT, specific behaviors, known as *pivotal behaviors*, are seen as central in affecting general areas of functioning. By changing these pivotal behaviors, it is believed that other associated behaviors will change without being specifically targeted.<sup>33</sup> There are four categories of pivotal behaviors: responsivity to multiple cues; motivation; self-management; and child self-initiations.<sup>34</sup> An example of both self-initiation and motivation can be seen in the child that asks for juice (self-initiation), but the juice is out of reach, so he is made to ask for it

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<sup>31</sup> Shore, 154.

<sup>32</sup> Exkorn, Karen Siff, *The Autism Sourcebook*, (New York: ReganBooks/HarperCollins Publishers, Inc., 2005), 307.

<sup>33</sup> Exkorn, 108.

<sup>34</sup> UC San Diego, "Pivotal Response Training Theory," <http://autismlab.ucsd.edu/about/pivotal-response-training.shtml> (accessed March 14, 2011).

(being motivated to use words to get the juice). This behavior is then generalized by the child to similar situations, like asking for a toy.

PRT techniques include positive reinforcement, changing and correcting behaviors, and giving the child choices. To address communication and behavioral challenges, PRT focuses on teaching children how to engage in effective social interactions, such as learning how to ask questions and initiating social interactions. PRT draws upon the natural motivations and individual interests of each child to make learning fun and interesting. And rather than sessions occurring in a clinical setting, PRT is designed to fit into a child's everyday life. It uses natural learning opportunities at home, school, and in the community. This makes parent involvement critical to its success.<sup>35</sup>

*Treatment and Education of Autistic and Communication related handicapped Children (TEACCH)*. TEACCH is an autism program that is a division of the University of North Carolina at Chapel Hill Department of Psychiatry, and was initiated in the early 1970s.<sup>36</sup> The philosophy of TEACCH is that the environment should be modified to meet the needs of the student, not the other way around. As an example, if a child is over-stimulated in a given environment, either the environment must be adapted to the needs of the child or the child must be placed in a different environment that promotes his or her individual learning needs.<sup>37</sup>

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<sup>35</sup> Exkorn, 108.

<sup>36</sup> Stillman, 157.

<sup>37</sup> Exkorn, 111.



TEACCH is a structured approach that does not rely on one technique; it is a complete program of services that incorporates several techniques and methodologies. Programs are developed to meet the student's specific communication, social, and overall coping needs. The goal of TEACCH is to help people on the autism spectrum learn functional skills to realize their full potential so they may live more effectively at home, at school, and in the community.<sup>38</sup>

The structured teaching approach of TEACCH emphasizes strengths more than remediating weaknesses. This approach involves careful organization of the environment and predictable ordering of tasks and events, and employs the following elements:<sup>39</sup>

- Organization of the physical environment;
- Predictable sequence of events;
- Routines with flexibility;
- Visual schedules;
- Visually structured activities;
- Work/activity systems.

Developmental Individual Difference Relation-Based Intervention (DIR). This is also known as the "Floortime" approach. With this method, parents and professionals follow the child's lead to encourage maintaining attention, relatedness, and two-way communication. By capitalizing on children's interests and motivations, Floortime helps children master interpersonal, emotional, and intellectual skills.<sup>40</sup>

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<sup>38</sup> Ibid., 111.

<sup>39</sup> Shore, 169-71.

<sup>40</sup> Exkorn, 106.

The floortime approach was developed by Dr. Stanley Greenspan, a child psychiatrist and professor of psychiatry, behavioral sciences, and pediatrics at George Washington University Medical School. It is an intensive intervention that seeks to engage the child by building on the relationship established when the parent or therapist gets “down on the floor” to interact with the child during playtime. This leads to learning opportunities within the context of the relationship.<sup>41</sup>



*Figure 1.9: Floortime<sup>42</sup>*

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<sup>41</sup> Stillman, 158-9.

<sup>42</sup> The Autism News, “Floor Time and Play Time,” <http://www.theautismnews.com/2010/05/31/floor-time-and-play-time/> (accessed February 10, 2011).

The floortime approach identifies six developmental milestones that a child with autism needs to master in order to develop the necessary skills in communication, thinking, and coping with the world on an emotional level. Each milestone must be mastered before moving to the next level. These milestones are:<sup>43</sup>

- 1) Self-regulation and interest in the world;
- 2) Intimacy;
- 3) Two-way communication;
- 4) Complex communication;
- 5) Emotional ideas;
- 6) Emotional thinking.

Relationship Development Intervention (RDI). RDI is a method created by psychologist Dr. Steve Gutstein, and is meant to provide the ability to achieve a “true quality of life” for the majority of the people on the autism spectrum. Dr. Gutstein developed RDI to address the challenges he faced in replicating traditional one-on-one autism treatments across environments. He discovered that his clients were not able to generalize what they had learned in therapy sessions to real-world environments.<sup>44</sup>

RDI focuses on remediating the delays and differences in cognition, emotion, communication, and social interaction that cause difficulty for those with autism. RDI attempts to develop *dynamic intelligence*, or creating emotional connectedness with others. It requires heavy family involvement to guide the student toward more flexibility and thoughtfulness by presenting novel and increasingly unpredictable

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<sup>43</sup> Shore, 158-9.

<sup>44</sup> Stillman, 159.

settings to challenge the student's growth.<sup>45</sup> This is achieved through mastering everyday activities, using a variety of communication options, developing pleasing memories linked to learning opportunities, and continually challenging the child to expand their experiences.<sup>46</sup>

RDI focuses on six areas of emotional intelligence:<sup>47</sup>

- 1) Emotional referencing: Allows a person to understand how others are feeling through verbal, non-verbal, and other communication pathways.
- 2) Social coordination: What people use to match or complement others' emotions.
- 3) Declarative language: Allows you to make statements about the world using words or non-verbal communication.
- 4) Flexible thinking: Enables one to go with the changing flow of events, even when they are unpredictable.
- 5) Relational information processing: Being able to adjust the volume of your voice to the environment.
- 6) Foresight and hindsight: Prediction and evaluation.

Educating children in the six areas listed above forms the basis for the RDI

practitioner to concentrate on the eight guiding principles of RDI:<sup>48</sup>

- 1) Building a strong foundation;
- 2) Developing a user-friendly environment;
- 3) Implementing guided participation through a "master" and "apprentice" relationship;
- 4) Improving personal episodic memory;
- 5) Building motivation for dynamic systems;
- 6) Changing communication;
- 7) Creating opportunities for practice;
- 8) Progressive generalization.

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<sup>45</sup> Shore, 164.

<sup>46</sup> Stillman, 160.

<sup>47</sup> Shore, 165-6.

<sup>48</sup> Ibid., 166-7.

*Social Communication Emotional Regulation Transactional Support Model*

(SCERTS). SCERTS is similar to TEACCH. One of the key characteristics of the SCERTS model is to use whatever approaches exist to best match the student's needs, making it more of a philosophy than an intervention.<sup>49</sup>

The SCERTS model is based on the components of its name:<sup>50</sup>

- 1) Social communication
- 2) Emotional regulation
- 3) Transactional supports

Social communication seeks to enhance spontaneous language and social interactions. Using everyday activities and daily routines as teaching opportunities, a communication partner helps the child to express emotions and encourages communication about the things that interest them. To help the child learn to regulate their emotions, SCERTS employs strategies such as deep pressure, music, opportunities for activity and movement, and a calm, soothing environment. Interfering behaviors are addressed by supporting a child's emotional regulation across all settings. In addition, SCERTS provides transactional support to families and other caretakers to assure a smooth team process and reduce stress. SCERTS is designed to support the child across home, school, and community settings.<sup>51</sup>

**Clinical.** Clinical treatments are medically-related interventions. These include both conventional and complementary approaches.

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<sup>49</sup> Ibid., 173.

<sup>50</sup> Ibid., 173.

<sup>51</sup> Exkorn, 303.

Doctors. Medical professionals obviously play a critical role in the diagnosis and treatment of autism. Pediatricians are key players insofar as they are in a position to observe the early warning signs, and recommend further evaluation and testing. This can include referrals to specialists such as developmental and behavioral pediatricians, pediatric neurologists, child psychiatrists and psychologists, gastroenterologists (to assess gut-related issues), geneticists (to identify or rule out any co-existing conditions), etc. In addition to the testing that these specialists accomplish in their offices, these visits often result in referrals for even further testing, such as diagnostic imaging (e.g. MRIs), laboratory testing, and electroencephalograms (EEGs), to name just a few.

DAN! Doctors and Bio-medical Treatments. Many medical professionals that have committed themselves to the study of autism practice what is referred to as the DAN! protocol. DAN! refers to the Defeat Autism Now project of the Autism Research Institute (ARI), and is based on the bio-medical treatment of autism. DAN! doctors create unique treatment plans for each patient that is based on four elements:

- 1) Nutritional supplementation
- 2) Dietary interventions
- 3) Detoxification
- 4) Medication

The major feature of this treatment regimen is nutritional supplementation. Autistic children typically have a vast array of nutritional deficiencies and dependencies, as well as some excesses. Overcoming the deficiencies and dependencies invariably requires supplements. These supplements – consisting of vitamins, minerals, amino

acids, essential fatty acids, enzymes, and herbal preparations – are uniquely beneficial in overcoming nutrient deficiencies, and they also can trigger various metabolic healing processes. They are also ideal for fulfilling nutrient dependencies.<sup>52</sup>

In addition, DAN! doctors also often recommend dietary interventions (discussed below in the “Nutritional” section); the process of detoxification (discussed below in the “Other Treatments” section); and also various medications. The medications prescribed by DAN! doctors are for physical conditions (such as yeast overgrowth) rather than psychological drugs (see discussion of medications below).

The process of designing a bio-medical treatment regimen for a particular child involves extensive and on-going laboratory testing. This can include blood tests, urine tests, fecal tests, and even hair tests.<sup>53</sup> Some of the tests that are run on these samples are very specialized, therefore it is often necessary to ship the samples to a special laboratory that can perform the required tests.

Speech Therapy. Because many autistic individuals have difficulty with verbal communications, speech therapy is a key component of most treatment programs. Speech therapy helps a child to communicate more effectively both verbally and non-verbally. Speech therapy also teaches the pragmatics of language, such as how to initiate and sustain a conversation. Children may be taught to read body language and facial expressions, as well as how to organize their thinking. Speech therapy sessions incorporate language-based exercises, games, and activities. For non-verbal children,

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<sup>52</sup> Bock, Kenneth, and Cameron Stauth, *Healing the New Childhood Epidemics: Autism, ADHD, Asthma, and Allergies* (New York: Ballantine Books, 2008), 247.

<sup>53</sup> *Ibid.*, 311-12.

augmentative treatments are typically used, such as American Sign Language, communication boards, Voice Output Communication Devices, and Picture Exchange Communication Systems (PECS).<sup>54</sup>

*Physical Therapy (PT).* Physical therapy is required when there are deficits in gross motor skills. Many children with autism do not have any deficits in this area, but others have extensive issues,<sup>55</sup> such as low muscle tone or poor posture, balance, and coordination.<sup>56</sup> The goal of PT is to improve functioning. Range of motion and flexibility are addressed, as the physical therapist works to increase a patient's independence by increasing balance, coordination, and strength.<sup>57</sup>

PT sessions incorporate passive, active, and resistive exercises, as well as functional and developmental skills training. Physical therapists use therapeutic exercises along with equipment such as weights, exercise balls, and balance boards to increase muscle strength and endurance and to facilitate body awareness and coordination. Aquatic, aerobic, and breathing exercises can also be used.<sup>58</sup>

*Occupational Therapy (OT).* When treating young children with autism, occupational therapy has nothing to do with job skills. OT is used to help these children achieve competence in all areas of their lives, to include self-help, play, socialization, and communication. OT provides support for children who have difficulty with sensory, motor, neuromuscular, and visual skills. Children are taught how to balance their body

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<sup>54</sup> Exkorn, 110-11.

<sup>55</sup> Tilton, 218.

<sup>56</sup> Exkorn, 109.

<sup>57</sup> Tilton, 218.

<sup>58</sup> Exkorn, 109.



weight, respond to touch, communicate with others, and accomplish daily tasks. OT can also assist in the development of appropriate social, play, and learning skills.<sup>59</sup>

Occupational therapists often use specialized equipment, such as swings, trampolines, climbing walls, and slides, to help children that have gross motor coordination and sensory issues. Fine motor skills such as writing and drawing are also addressed. Therapists will use a variety of techniques based upon the needs of the individual child. Many techniques are aimed at sensory issues, such as brushing, wearing a weighted vest, deep pressure, and joint compression. These techniques can be duplicated at home or in other settings by parents and caregivers. These techniques are often referred to as Sensory Integration Therapy.<sup>60</sup>

Medication. Although they are generally used as a last resort, certain medications are sometimes prescribed for autism. Medications are also sometimes used at the onset of an overall therapy program to establish a degree of control over the child in order for the therapy to be implemented and take effect.

The medications typically used to treat autism fall into two categories: 1) Psychoactive medications; and 2) Co-morbid disorder medications. Psychoactive medications (which directly target the brain) include antidepressants; atypical antipsychotics; anticonvulsants; stimulants; and anti-opioids. Co-morbid disorder

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<sup>59</sup> Exkorn, 107.

<sup>60</sup> Ibid., 107-8.

medications (which target various physical problems that indirectly affect the brain) include antibiotics; antivirals; antifungals; and anti-inflammatories.<sup>61</sup>

Although medications have their limitations, and are generally only used in conjunction with other treatment therapies, they can provide three unique elements:

- 1) Medications can quickly control extreme behavioral symptoms and certain physical problems.
- 2) Medications can help solve certain long-term issues, such as chronic infections.
- 3) Medications can help correct the many diverse physical factors that affect the brain, including bowel and immune system problems, allergies, inflammation, nutritional deficiencies, and metabolic imbalances.<sup>62</sup>

**Nutritional.** Nutritional therapies, in particular specialized diets, have gained in popularity as a treatment for some of the symptoms of autism, as well as to address some of the related conditions typically present in autistic individuals. Dietary factors can contribute significantly to the symptoms of autism, and altering the diet can play a primary role in the healing process.<sup>63</sup>

Some of the more common diets are:<sup>64</sup>

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<sup>61</sup> Bock, 336-51.

<sup>62</sup> Ibid., 330-33.

<sup>63</sup> Ibid., 200.

<sup>64</sup> Ibid., 200-45.

- 1) The Gluten-Free/Casein-Free (GFCF) Diet: Removes the two most common foods that people with autism have reactions to – gluten and casein.
- 2) The Specific Food Reaction Diet: Removes the specific foods to which a particular child is uniquely reactive.
- 3) The Anti-Yeast Diet: Yeast, or candida overgrowth, is quite common among children with autism. The anti-yeast diet restricts foods that contain yeast (like bread), foods that stimulate the growth of yeast (like sugar), and foods that contain other forms of mold or fungus.
- 4) The Anti-Hypoglycemia Diet: Low blood sugar is common among children with autism. This diet avoids sweet, sugary foods and high-starch foods, and is based on foods that are more slowly digested, such as high-protein and high-fiber foods.
- 5) Specific Carbohydrate Diet (SCD): The SCD diet limits the amounts and types of carbohydrates that can be eaten.
- 6) The Low Oxalate Diet: This diet consists solely of reducing or eliminating the food component called an oxalate. Oxalates interfere with calcium metabolism, and can interfere with proper functioning of the gut. High-oxalate foods and beverages are eliminated from the diet.

While one of the above listed diets is sometimes sufficient, it is also common to combine two or more of these diets.<sup>65</sup>

**Other Treatments.** This category contains some of the more non-traditional treatments that are used for autism, but have gained a level of acceptance in the autism community.

*Hyperbaric Oxygen Therapy (HBOT).* HBOT involves inhaling up to 100% oxygen at greater than 1 atmosphere absolute (ATA) in a pressurized chamber. This procedure delivers increased oxygen to the tissues. The rationale for HBOT for patients with neurological and developmental disorders is to relieve hypoxia. The resulting oxygen increase leads to improvements in microcirculation, a lowering of the presence of bacteria in the gut, decreasing inflammation, and improved immune function, all of

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<sup>65</sup> Ibid., 200.

which are often indicated in patients with autism. HBOT can also lower oxidative stress and increase intracellular glutathione,<sup>66</sup> a chief antioxidant produced in the liver. For the treatment of autism, 40 one-hour sessions is usually the minimum recommended.

HBOT treatments are typically delivered in one of two ways – in a *hard chamber* or in a *soft chamber*. Hard chamber HBOT treatments are done in a hospital or clinic specifically set up for such a purpose. The advantage of the hard chamber is that you can achieve greater pressure levels (typically around 3 ATA). The chambers are large enough for a parent or caregiver to accompany the child inside (see Figure 1.10).



Figure 1.10: Hard Chamber Hyperbaric Oxygen Therapy<sup>67</sup>

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<sup>66</sup> Jepson, Bryan, *Changing the Course of Autism* (Boulder, CO: Sentient Publications, 2007), 256-7.

<sup>67</sup> Center for Advanced Medicine, "Images," <http://www.centerforadvancedmedicine.com/images/HBOT.jpg> (accessed February 13, 2011).

HBOT soft chambers are a relatively new development. These are inflatable chambers that can achieve pressures in the 1.3 ATA range. These chambers are portable, and can be used in the home (see Figure 1.11).



*Figure 1.11: Soft Chamber Hyperbaric Oxygen Therapy*<sup>68</sup>

**Detoxification.** High levels of heavy metals and environmental chemicals are often found in autistic individuals. The goal of detoxification is to rid the body of these environmental toxins and also to build up the body's resistance to them. Detoxification measures include the administration of glutathione, boosting the process of methylation (the body's natural detoxification process), and engaging in chelation therapy.<sup>69</sup> Chelation is a procedure in which a patient is given a medication that attaches to heavy metals, and helps the body to excrete them.<sup>70</sup>

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<sup>68</sup> Jakob's Ladder, "HBOT," [http://jakobs-ladder.org/index.php?p=1\\_7](http://jakobs-ladder.org/index.php?p=1_7) (accessed February 13, 2011).

<sup>69</sup> Bock, 294.

<sup>70</sup> Ibid., 305.

Glutathione is typically administered as a topical cream which is absorbed through the skin, but it can also be administered intravenously. Boosting the methylation process is generally accomplished through nutritional supplements. Chelation can be done through the use of suppositories, but is most effective when given intravenously.

*Music Therapy.* Music therapy is the process of using music to address the physical, emotional, and social needs of an individual. Although autism affects neurological structures involved with speech, research shows that communication through music often remains intact. This allows music therapy to assist some individuals to better express their feelings and improve their communication skills.<sup>71</sup>

Music therapy sessions can take place most anywhere, including in the home. There are single family sessions as well as group sessions. Instruments are made available so that all participants can interact.



*Figure 1.12: Music Therapy Session<sup>72</sup>*

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<sup>71</sup> Shore, 193.

<sup>72</sup> The Children's Therapy Center, "Our Services," <http://login.npwebsiteservices.com/Thechildrenstherapycenter/Services.asp> (accessed February 19, 2011).

## ***Resources/Support Services***

Autism is a condition that affects not just the individual, but the entire family. The availability of resources and support services can be nearly as important as the treatment of the condition itself. Discussed below are some of the more common resources and support services available.

**Social Workers.** A family dealing with autism will likely encounter numerous social workers. They are often employed by various governmental agencies as case workers for various programs, and can also work in schools as program coordinators for special needs students. A licensed clinical social worker (LCSW) is a mental health professional that deals with a variety of emotional and societal issues. They specialize in maintaining the social functioning of an individual in a group. Their goal is to create the best possible social situation for the child and the family.<sup>73</sup>

**Support Groups.** Support groups can play an important role in helping a family navigate the journey that an autism diagnosis brings. The advantage of autism support groups is that the members have travelled down the same path, and can offer a wealth of information. And you can vent your frustrations to them without having to explain autism in the process!<sup>74</sup> The camaraderie gained with other parents through support groups can greatly reduce any sense of isolation parents may be feeling.<sup>75</sup>

**Counselors.** Various types of counseling services are often needed by families dealing with autism. At the top of this list is marriage counseling. While there are

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<sup>73</sup> Tilton, 220.

<sup>74</sup> Ibid., 243.

<sup>75</sup> Shore, 342.

varying claims regarding whether the divorce rate for parents of autistic children is any higher than the national average or not, there is no question that raising a child with autism places an enormous amount of stress on a marriage. The couple typically focuses on the care of the child, and often neglect each other. It is important to still make time for your spouse, and marriage counselors can assist in this regard.

Similarly, if there are other children in the family, they can often feel neglected because the autistic sibling is getting “all of the attention.” Therefore, family counseling can play an important role in helping families deal with the dynamics of sibling and parent-child relationships.

Another area of need is personal financial counseling. As mentioned above, the costs of caring for a child with autism can be enormous, well beyond the means of many families. Even when services are provided by the DOE, the cost of medical expenses, bio-medical interventions, special diets, assessments, etc., can be staggering. Currently, only 23 states have enacted autism insurance reform laws.<sup>76</sup> Generally speaking, these laws require private insurers to cover the costs of ABA, and are limited to \$30,000 to \$50,000 per year. However, a full-time ABA program in a private clinic can run well over \$100,000 a year.<sup>77</sup> Hawaii currently has an autism insurance reform bill making its way

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<sup>76</sup> Autism Votes, “Autism Speaks State Autism Insurance Reform Initiatives,” [http://www.autismvotes.org/site/c.frKNI3PCImE/b.3909861/k.B9DF/State\\_Initiatives.htm](http://www.autismvotes.org/site/c.frKNI3PCImE/b.3909861/k.B9DF/State_Initiatives.htm) (accessed February 18, 2011).

<sup>77</sup> Pacific Autism Center, “Tuition,” <http://pacificaautismcenter.com/info-resources/tuition/> (accessed February 18, 2011).



through the legislature. If enacted into law, it would be effective starting in 2012, and would have an annual benefit of \$50,000.<sup>78</sup>

**Government agencies.** There are numerous governmental agencies in each state that provide various resources and support related to special needs children. These typically fall under the state's Department of Health, such as the Developmental Disabilities Division in Hawaii. Support from these agencies can be in the form of respite services, counseling, and financial assistance for those who qualify.

**Private organizations.** There are many private organizations associated with the autism community. These include The Autism Society, Autism Speaks, and Talk About Curing Autism, to name just a few (refer to Appendix A for a more comprehensive list). Many of these organizations have local chapters with regular meetings, and all have web sites, providing a wealth of information about all things related to autism.

**Chaplains.** For those with religious affiliations, chaplains can be an important source of support.

**Respite.** Everyone needs a break, and respite care is for both the caregiver and the child. It is beneficial for both, and essential for parents. Everyone in the family is affected by the needs of a child with autism, and exhaustion and burn-out is common.<sup>79</sup> Funding for respite services can sometimes be procured through various government programs.

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<sup>78</sup> Autism Votes, "State Initiatives-Hawaii," <http://www.autismvotes.org/site/c.frKNI3PCImE/b.3937867/k.B64E/Hawaii.htm> (accessed February 18, 2011).

<sup>79</sup> Tilton, 236.

**Legal Support.** The need for legal services sometimes comes into play when the family of a school-aged child with autism and the local school district cannot agree on the most appropriate placement and/or services for the child. There are many attorneys who now specialize in special education laws, and can provide legal advice to parents on such matters.

**The Internet.** There is obviously a wealth of information that can be accessed via the internet. Online support groups, web sites for all of the various autism organizations, mailing lists and newsletters, news and information; all this and more can be found online.

### ***Implications for a Comprehensive Autism Treatment, Resource, & Support Center***

The treatment options and resource/support services outlined above provide direction as to what spaces should be included in a comprehensive ATRSC. The following list is an attempt to codify these requirements into the functions and spaces that might be required.

#### Educational Spaces

- *Group classrooms:* For group sessions, to encourage interaction and develop social skills.
- *Individual (one-on-one) classrooms:* For one-on-one sessions (table time).
- *Observation rooms:* These rooms are typically situated between classrooms, but can be adjacent to any space where observation is required. This allows observation of therapy sessions by both the staff as well as the parents.
- *Quiet rooms:* These rooms provide a space for a child to unwind when they become overworked or experience sensory overload.
- *Play rooms:* Can be used for breaks and also for therapy sessions.
- *Sensory rooms:* These rooms provide appropriate environments for children seeking sensory input.

- *Music room:* For music therapy sessions.
- *Art room:* For arts and crafts that are incorporated into a student's curriculum.
- *Computer labs:* These are for both the students and parents. There are many therapy programs that are computer based, and for some children, working with a computer is easier for them. Parents can use a computer lab to access resources over the internet, or just relax and catch up on e-mail while their child is in a therapy session.
- *Gymnasium:* For recreational activities; the gym might also be utilized by physical and occupational therapists.

### Clinical Spaces

- *Doctors' offices:* Offices for permanently assigned staff, as well as additional office space for visiting specialists.
- *Nurses' offices:* Administrative offices for nursing support.
- *Exam rooms:* For routine interactions between medical staff and patients.
- *Treatment rooms:* For more involved procedures, such as IV chelation, allergy testing, etc.
- *Clinical laboratory:* To test and analyze all samples (blood, urine, stool, hair).
- *Compounding pharmacy:* To fill all prescriptions, including specialized compounds.
- *Functional MRI (fMRI) room:* Used to assess the neural development of the brain.
- *SPECT scan room:* Used to assess brain function; can indicate the effectiveness of various therapies through before-and-after imaging.
- *Physical therapy space:* For PT procedures.
- *Occupational therapy space:* For OT procedures.
- *Speech therapy rooms:* Dedicated room(s) with additional sound attenuation.
- *HBOT rooms:* For hyperbaric oxygen therapy treatments.
- *Dietician's office:* For counseling regarding special diets.
- *Dental treatment room:* Larger than a standard DTR, so parent(s) can accompany the child. OK for child to take a break mid-procedure. Parents and staff are understanding when children act out.

### Support Spaces

- *Lobby/Waiting area*: Spacious and comfortable for both children and adults.
- *Reception/Administrative area*: Adjacent to waiting area; central reception for all functions in the ATRSC.
- *Intake Area*: For initial consultations.
- *Library/Bookstore*: Autism related books, periodicals, videos, etc. available for loan or purchase.
- *Cafeteria*: Offering a special diet menu in addition to a traditional menu.
- *Specialized grocery store*: Stocked with items based on the requirements of the specialized diets; also a full selection of nutritional supplements.
- *Parent/Family lounge*: For parents to relax while their child is in therapy.
- *Conference/Training rooms*: For staff training; parent training; seminars by visiting experts; support group meetings, etc.
- *Barber shop*: Children's-style barber shop, but with only autistic children, it provides a comfortable environment with understanding parents and staff when children act out (see figure 1.13).
- *Family/Marriage Counseling Rooms*: Large enough to accommodate most families, with additional sound attenuation.
- *Pediatric Counseling Rooms*: Specifically for children, addressing sibling relationships, etc. Would have small tables, games, etc.
- *Legal aid office*: To consult with a lawyer or other legal advisor, with additional sound attenuation.
- *Chapel*: Small, non-denominational chapel (similar to what is found in some hospitals) for those who find comfort in prayer.
- *Relaxation room (adult)*: Quiet room with recliners where parents can catch a nap.
- *Relaxation room (child)*: Quiet room with toddler beds, beanbag chairs, etc. where children can catch a nap.
- *Exterior play area*: For the children to work off their pent-up energy.
- *Break Room*: For staff.
- *Multi-Function Rooms*: These are rooms that can serve multiple functions, be it educational, clinical, or support. These would be particularly applicable when demand for specific rooms is low or there are budgetary constraints. Several functions can be accommodated in a single space (e.g. administrative offices; conference/training/classrooms; music/art rooms; etc).



*Figure 1.13: Children's Barber Shop (Pigtails & Crewcuts, Honolulu, HI)<sup>80</sup>*

## **Conclusion**

We now have an idea of what autism is and all that it entails; an understanding of why it is deemed an urgent public health concern; the various treatment options available; and the resources and support services that families require. This information has generated the development of a list of spaces that could possibly be appropriate for inclusion in a comprehensive autism treatment, resource, and support center. This list will form the basis for further study, the results of which will eventually be developed into a planning and programming document for such facilities.

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<sup>80</sup> HonoluluAdvertiser.com, "A Cut Above," <http://the.honoluluadvertiser.com/article/2010/Jan/26/il/hawaii1260303.html> (accessed February 18, 2011).

## **CHAPTER 2: PROJECT STATEMENT**

Driven by the educational, clinical, and support requirements of people with autism and their families, we now have a preliminary list of functions to consider in the preparation of planning, programming, and design guidance for comprehensive autism treatment, resource, and support centers. In the following chapters, this list will be further refined through a variety of techniques. The ultimate goal is to provide a tool to the architecture profession that will guide the planning, programming, and design of such facilities.

First, by examining some of the existing “multi-function” autism treatment facilities that have combined various services together, we may discover new functions to add to the list. It will also provide the opportunity to evaluate the synergistic effect of co-located services.

Second, we will step outside the world of autism and consider case studies of two facilities that have embraced the “comprehensive care” and “holistic, family-centered” approach that we wish to emulate in ATRSCs – the Cancer Treatment Centers of America, and the National Intrepid Center of Excellence (traumatic brain injury clinic) at Walter Reed Medical Center. In addition, a local family will be selected as the subject for a case study, to document their personal “autism journey,” and to gain further insight into what the needs are of a family facing autism.

Third, the current “state-of-the-art” in designing facilities for autism will be explored. This information focuses on the specifics of the environment, and how that

environment is designed to accommodate the behavioral and sensory issues of individuals with autism. In addition to providing the basis for individual room criteria, this information could provide additional clues as to functions that may have been overlooked.

Finally, the results of qualitative research should provide a wealth of information as to what families and other caregivers would truly like to see in an ATRSC. Surveys completed by a variety of individuals (parents, doctors, behavioral specialists, educators, etc.) will indicate what they feel is most important, and will serve to prioritize the functions in the programming and planning document.

Based on the analysis of this combined information, the final document will be developed. Again, the intent of this project is to develop planning, programming, and design guidance for comprehensive Autism Treatment, Resource, and Support Centers that will accommodate the full range of needs for people with autism and their families. It is hypothesized that comprehensive ATRSCs *can* provide a new, synergistic approach to the treatment of autism that is based on a holistic, family-centered model, thereby improving outcomes and the quality of life for patients and their families.

The need for this type of facility in Hawaii was underscored by the December 2008 *Report to the Twenty-Fifth Legislature, State of Hawai'i, 2009* by the State Department of Health, Children with Special Health Needs Branch. This study was prepared to inform legislative decision-makers regarding bills relating to health insurance coverage for autism. While the primary focus of this report was insurance

coverage, it also made several other recommendations. One of these was “An ASD specialty center (“one-stop”) should be available to provide comprehensive services, including diagnosis, intervention/treatment, referrals, and resource information.”<sup>81</sup> This is essentially stating the need for an ATRSC in Hawaii. The report makes further recommendations that support the ATRSC concept, including:<sup>82</sup>

- Strategies should be developed to improve the coordination of primary, specialty, therapy, behavioral, and other health services for children/youth with ASD.
- Strategies should be developed to increase the coordination of medical, education, and social services for children/youth with ASD.
- Information and training resources for ASD for professionals and families should be made available.
- Families of children/youth with ASD statewide should have access to a parental support and information network.

Therefore, in addition to providing a design guide that can be used by architects anywhere, this report will also provide an example of the application of this criteria, by way of developing a schematic design for an ATRSC in Hawaii. It is hoped that this effort may in some way encourage the fulfillment of the recommendations outlined in the report to the twenty-fifth legislature – a one-stop shop with coordinated care, information, resources, and support for children with autism and their families.

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<sup>81</sup> State of Hawaii, *Report to the Twenty-Fifth Legislature, State of Hawaii, 2009, Pursuant to Act 221, H.B. 2727, H.D. 2, S.D. 1, C.D.1, Hawai'i State Legislature, 2008, Relating to Health Insurance* (State of Hawai'i, Department of Health, Health Resources Administration, Family Health Services Division, Children with Special Needs Branch, December 2008), 7.

<sup>82</sup> *Ibid.*, 1.



### **CHAPTER 3: EXISTING FACILITIES**

There are numerous facilities today that offer multiple services in one location. Many of these facilities claim to be “one-stop shops” for autism. However, when we examine the services that these facilities offer, none of them are truly “comprehensive” when compared to all the possible services and supports that have been outlined so far in this report. Typically, these facilities are proponents of a particular treatment approach (such as applied behavior analysis), and *may* combine that approach with other, complementary therapies, as well as a range of support services. There seem to be no facilities, however, that take a neutral stance regarding the various treatment modalities; they offer only what their leadership feels is most appropriate. In a patient-centered practice, the patient and the family would be introduced to all treatment options, and would be allowed to choose what they are most comfortable with. They would not be limited in their choices, and they would not have to travel to several locations to have access to, and compare, all the options.

The following list of facilities is by no means exhaustive, but provides a sample of some of the more notable multi-service facilities for autism in the United States.

#### ***The MIND Institute***

The Medical Investigation of Neurodevelopmental Disorders (M.I.N.D.) Institute is part of the University of California-Davis Health System in Sacramento, CA. It “is a collaborative international research center committed to the awareness, understanding,

prevention, care, and cure of neurodevelopmental disorders.”<sup>83</sup> The founders of the MIND Institute sought to bring together experts from the fields of neuroscience, education, molecular biology, developmental pediatrics, occupational therapy, and psychology, in order to work together towards the goal of curing neurodevelopmental disorders. The initial focus was on autism, but their research now includes other disorders such as Tourette syndrome, Fragile X syndrome, and attention deficit/hyperactivity disorder (ADHD).<sup>84</sup>

The MIND Institute combines both clinical and research spaces. It is a mini-campus of several buildings that include an outpatient clinic, academic office building, resource center (library), and a wet research laboratory. Intended as a place for multidisciplinary collaboration, the design provides space where practitioners each have their own areas to study and see patients. In addition, these spaces were laid out in such a way as to promote the desired collaboration. The buildings are focused inward on a series of courtyards, and the designer (Hammel, Green and Abrahamson) used the concept of creating a “necessary nuisance” to meet the social engineering goal of creating informal meeting places. The necessary nuisance is something you have to go out of your way to get, and in this case it is coffee – a roof terrace café that overlooks one of the courtyards is the only place in the MIND Institute where you can get it. The

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<sup>83</sup> UC Davis MIND Institute, “Advancing Toward A Cure-Vision,” <http://www.ucdmc.ucdavis.edu/mindinstitute/> (accessed March, 7, 2011).

<sup>84</sup> Ibid., “UC Davis MIND Institute History,” <http://www.ucdmc.ucdavis.edu/mindinstitute/aboutus/index.html> (accessed March, 7, 2011).

café creates opportunities for scientists and doctors to get together and share information.<sup>85</sup>

In addition to collaboration amongst the staff, the idea behind the MIND Institute is to encourage intermingling of autism patients and their families with the lab researchers and doctors. This is facilitated by a common parking lot, a single main building entrance, and plenty of convenient nooks to facilitate a chat.<sup>86</sup> This is a sound idea, and the architects did an outstanding job of addressing this in the design. However, access to researchers is not something the families need on a daily basis. But the concept of intermingling the different groups is related to the idea of combining needed resources into a comprehensive autism treatment, resource, and support center. Where the MIND Institute falls short is the failure to offer alternative therapies, ancillary support services (although these would be available at the UC Davis Medical Center), and resources and support services for the families.



*Figure 3.1: The MIND Institute, Sacramento, California<sup>87</sup>*

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<sup>85</sup> Libby, Brian, "Psychologically Accessible," *Architecture Week*, February 9, 2005.

[http://www.architectureweek.com/2005/0209/design\\_2-1.html](http://www.architectureweek.com/2005/0209/design_2-1.html) (accessed February 22, 2011).

<sup>86</sup> Platter, Dave, "Autism Facility Designed to Calm the Mind," *Interior Design*, December 10, 2003.

<sup>87</sup> Libby.



*Figure 3.2: The MIND Institute, Waiting Area<sup>88</sup>*



*Figure 3.3: The MIND Institute, Assessment Room<sup>89</sup>*

<sup>88</sup> Ibid.

<sup>89</sup> Ibid., [http://www.architectureweek.com/2005/0209/design\\_2-2.html](http://www.architectureweek.com/2005/0209/design_2-2.html) (accessed February 22, 2011).

### ***Hope Network's Center for Autism***

The Hope Network's Center for Autism is located in Grand Rapids, Michigan. This facility combines several services under one roof – applied behavior analysis, occupational therapy, speech therapy, neuro-psychological evaluations, psychiatry, psychotherapy, social skills groups, and even residential options through the Hope Network's Developmental Adolescent Residential Treatment (DART) facility, located adjacent to the Center for Autism.<sup>90</sup> In addition, the Center provides primary care services and dental services.<sup>91</sup> The building features a diagnostic playroom, which shares a two-way mirror with an observation room; a gymnasium that hosts structured play and gross motor activities; a motor sensory room that includes a wall-to-wall swing; and a model living unit which features a bedroom, kitchen and bathroom, to teach daily living skills.<sup>92</sup> Also included are a multi-disciplinary treatment room; a family therapy room; a computer lab, and a classroom.<sup>93</sup>

The Hope Network Center for Autism is an excellent example of co-locating a wide range of autism-related services under one roof. Specifically, combining behavioral therapy with complementary services such as speech and occupational therapy, as well as educational spaces. It is also somewhat unique in that it provides

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<sup>90</sup> Hope Network, "Get Help, The Center for Autism, Available Services" <http://www.hopenetwork.org/Behavioral-Health/Autism/Services.aspx> (accessed March 8, 2011).

<sup>91</sup> King, Kyla, "Hope Network Opens State's 1<sup>st</sup> All-Inclusive Autism Center," [http://www.mlive.com/news/grand-rapids/index.ssf/2010/04/hope\\_network\\_autism\\_center\\_ope.html](http://www.mlive.com/news/grand-rapids/index.ssf/2010/04/hope_network_autism_center_ope.html) (accessed February 28, 2011).

<sup>92</sup> Barba, Lindsay, "A One-Stop Shop for Autism Services," *Behavioral Healthcare* 30(6) (2010 June): 28-31. <http://www.behavioral.net/ME2/dirmod.asp?type=Publishing&mod=Publications::Article&mid=64D490AC6A7D4FE1AEB453627F1A4A32&tier=4&id=AC89DB53BB4F4E46875A6E711B660223> (accessed March 8, 2011)

<sup>93</sup> Hope Network, <http://www.hopenetwork.org/Behavioral-Health/Autism/Services.aspx> (accessed March 8, 2011).

primary care and dental services, a major convenience for families. Some support services for families are also offered. The designers (Dixon Architecture) did an outstanding job of providing space for the services that were determined to be most in demand. This was done through a series of family forums, which also revealed that families were driving across town and across the state to go to multiple appointments.<sup>94</sup>



*Figure 3.4: Hope Network Center for Autism  
Gymnasium (left) and Motor Sensory Room (right)<sup>95</sup>*



*Figure 3.5: Hope Network Center for Autism  
Diagnostic Playroom (left) and Model Living Unit (right)<sup>96</sup>*

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<sup>94</sup> Barba.

<sup>95</sup> Hope Network, "Center for Autism Photo Tour," <http://www.hopenetwork.org/Behavioral-Health/Autism/Photo-Tour.aspx> (accessed March 8, 2011).

<sup>96</sup> Ibid.



*Figure 3.6: Hope Network Center for Autism  
Multi-Disciplinary Treatment Room (left) and Family Therapy Room (right)<sup>97</sup>*

The goal of the Hope Network was to create a “one-stop shop” for the autistic community of Grand Rapids,<sup>98</sup> and the facility has been referred to as an “all-inclusive autism center.”<sup>99</sup> However, with its focus on applied behavior analysis, the center fails to offer alternative therapies. In addition, there are no ancillary support services such as lab and x-ray, so these tests must be accomplished elsewhere. And family support services are limited to primarily family therapy.

### ***Kids Institute for Development and Advancement (KiDA)***

The Kids Institute for Development and Advancement is an integrated center for the treatment of autism spectrum disorders located in Irvine, CA. KiDA offers group and individual therapy to children of all ages.<sup>100</sup> With a staff that includes behavior

<sup>97</sup> Hope Network, “Center for Autism Photo Tour” <http://www.hopenetwork.org/Behavioral-Health/Autism/Photo-Tour.aspx> (accessed March 8, 2011).

<sup>98</sup> Barba.

<sup>99</sup> King.

<sup>100</sup> Kids Institute for Development and Advancement. “Programs.” <http://www.kida.com/programs/> (accessed March 9, 2011).

therapists, speech therapists, occupational therapists, and a special education teacher,<sup>101</sup> KiDA offers applied behavior analysis services, along with speech and OT, in several interesting formats. These include social-based learning (purposeful interactions with peers); played-based therapy; and co-treatment therapy, where speech and occupational therapists work together in a blended therapeutic model.<sup>102</sup>

The KiDA facility combines educational and therapeutic spaces with some support spaces such as a parent lounge. It has a large sensory gym (over 2,000 square feet) that includes a trampoline, therapy swings, rock climbing walls, tunnels, gym mats, balls, bolsters, and a slide. It also includes classrooms designed for individual therapy, class instruction, and small group play, as well as a full kitchen and dining area where the kids can practice cooking, eating, and socializing over meals.<sup>103</sup>

An outstanding feature of this facility is the parent lounge, which includes amenities such as internet access, magazines, and a coffee maker. It also serves as an observation room for parents, as the lounge is adjacent to the therapy gym and is equipped with a one-way mirror.<sup>104</sup> Typically, observation rooms are small, unfurnished rooms sandwiched between two therapy rooms, and are primarily for staff use, although parents are often allowed to use them to observe their child. The idea of being able to observe sessions from the comfort of the parent lounge shows that KiDA has taken into consideration the concerns of the entire family, not just the patient.

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<sup>101</sup> Ibid., "Our Staff," <http://www.kida.com/our-staff/> (accessed March 9, 2011).

<sup>102</sup> Ibid., "Frequently Asked Questions," <http://www.kida.com/faqs/> (accessed March 9, 2011).

<sup>103</sup> Ibid., "Our Facility," <http://www.kida.com/our-facility/> (accessed March 9, 2011).

<sup>104</sup> Ibid.





*Figure 3.7: Kids Institute for Development and Advancement Rock Climbing Wall in Sensory Gym (left) and Classroom (right)<sup>105</sup>*



*Figure 3.8: Kids Institute for Development and Advancement Full Kitchen (left) and Parent Lounge (right)<sup>106</sup>*

KiDA is yet another example of an excellent facility that has combined several services together, but by following primarily one treatment modality, it fails to offer the full range of services that should be available to families.

<sup>105</sup> Kids Institute for Development and Advancement, "Our Facility," <http://www.kida.com/our-facility/> (accessed March 9, 2011).

<sup>106</sup> Ibid.

### ***Integrative Hyperbaric Centers***

The Integrative Hyperbaric Centers, which are also referred to individually as “A Place of Grace,” are located in Irvine, California (California Integrative Hyperbaric Center), Fitchburg, Wisconsin (Wisconsin Integrative Hyperbaric Center), and Lynchburg, Virginia (where it is a component of the Rimland Center for Integrative Medicine, discussed separately below). These facilities treat patients with autism, traumatic brain injury, mitochondrial disorders, rheumatoid arthritis, and other diseases. Their primary service is hyperbaric oxygen therapy, but they also offer additional services that are of benefit to patients with autism. These include applied behavior analysis, speech and occupational therapy, physical therapy, and auditory integration. In addition, these facilities host medical doctors that practice the DAN! protocol of biomedical treatments for autism.<sup>107</sup>



*Figure 3.9: Wisconsin Integrative Hyperbaric Center<sup>108</sup>*

<sup>107</sup> Wisconsin Integrative Hyperbaric Center, “Services,” <http://www.wisconsinhyperbarics.com/services.html> (accessed Mar 9, 2011).

<sup>108</sup> Ibid., “Gallery,” <http://www.wisconsinhyperbarics.com/gallery.html#divImageNo> (accessed Mar 9, 2011).

The Integrative Hyperbaric Centers have made the effort to combine traditional behavioral therapies with biomedical interventions, to include HBOT treatments. However, they are still a long way from offering comprehensive services to families affected by autism.

### ***The Rimland Center for Integrative Medicine***

The Rimland Center in Lynchburg, Virginia, is a family-centered practice that brings together several functions. It includes a pediatric clinic (*Advocates for Children Pediatrics*); autism clinic (*Advocates for Families*); hyperbaric oxygen therapy (*Virginia Integrative Hyperbaric Center*); and alternative therapy and support services (*Sinergi Services*).<sup>109</sup> They have a DAN! doctor on staff, as well as a nurse practitioner, who specialize in biomedical treatments for autism.<sup>110</sup> Through Sinergi Services, they offer speech therapy, physical therapy, and occupational therapy; chelation/IV therapy; and patient education services.<sup>111</sup> This includes nutrition education, which is facilitated by a demonstration kitchen. There is also space in the center for lab equipment. And after hours, the Rimland Center serves as a meeting place for special needs organizations. Finally, the center has an on-site house for families visiting from out-of-town, rather than forcing them to find a hotel.<sup>112</sup>

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<sup>109</sup> The Rimland Center for Integrative Medicine, <http://www.rimlandcenter.com/RimlandCenter.php> (accessed March 9, 2011).

<sup>110</sup> Ibid., "Advocates for Families-A Place of Hope," <http://www.rimlandcenter.com/AdvocatesForFamilies.php> (accessed March 9, 2011).

<sup>111</sup> Ibid., <http://www.rimlandcenter.com/RimlandCenter.php> (accessed March 9, 2011).

<sup>112</sup> Ibid., "About Our Facilities" <http://www.rimlandcenter.com/AboutOurFacilities.php> (accessed March 9, 2011).

In addition, this facility also operates the Rimland Mentoring Center, an international center for mentoring clinicians in the Defeat Autism Now! approach. Clinical research is also conducted here, through the Autism Research Institute Discovery Center. The Rimland Center also houses an office for The Main Street Group, which offers financial planning and consultations.<sup>113</sup>



*Figure 3.10: The Rimland Center for Integrative Medicine*<sup>114</sup>

The Rimland Center offers a wide variety of services, and is particularly notable for its educational services for both clinicians and families. Having a financial planning firm on site, offering their space for use by local support groups, and providing a lodging facility are fairly unique aspects among autism centers. What seems to be missing here is any type of behavioral therapy, which is the basis for any autism treatment regimen.

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<sup>113</sup> Ibid., <http://www.rimlandcenter.com/RimlandCenter.php> (accessed March 9, 2011).

<sup>114</sup> Ibid. "About Our Facilities," <http://www.rimlandcenter.com/AboutOurFacilities.php> (accessed March 9, 2011).

And with their emphasis on biomedical and nutritional interventions, it would be a convenience for the families if there was a compounding pharmacy and specialized grocery store on site as well. Additional counseling services for families, beyond just financial, would also be appropriate.

### ***National Autism Center***

The National Autism Center in Randolph, Massachusetts, offers a good example of bringing clinical, educational, and support functions together in one location. Their Autism Spectrum Disorders Clinic offers diagnostic assessment services; therapeutic treatment services (behavioral treatment, social skills development); parent therapeutic and support services; and professional training programs.<sup>115</sup> The National Autism Center also houses a research center.<sup>116</sup>

The facility at the National Autism Center includes an impressive array of spaces: the ASD Assessment Clinic; treatment and evaluation rooms with two-way observational capacity; large, modern classrooms with individual computer and learning stations; space for nursing and allied health services and vocational training suites; areas for occupational, physical, and speech therapy; recreational facilities such as a children's indoor playroom, outdoor play area, a gymnasium, art and music rooms; and several support functions such as a high-tech learning facility for workshops, seminars and

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<sup>115</sup> National Autism Center, "Services and Research-Autism Spectrum Disorders Clinic." [http://www.nationalautismcenter.org/service/nac\\_clinic.html](http://www.nationalautismcenter.org/service/nac_clinic.html) (accessed March 9, 2011).

<sup>116</sup> Ibid., "Services and Research," <http://www.nationalautismcenter.org/service/> (accessed March 9, 2011).

training; a distance learning lab for online training; conference and meeting spaces; a cafeteria; and a library.<sup>117</sup>

The National Autism Center clearly provides a wide range of services, and their emphasis on support functions is admirable. Their commitment to helping families cope with the stress of an autism diagnosis, as well as to educating both families and professionals, is something to be emulated. But here again, when we look at the actual treatment options, the focus is only on behavioral therapy. There are no services directed towards biomedical treatments, special diets, hyperbaric oxygen therapy, etc., and no spaces that would support these services such as a compounding pharmacy, specialized grocery store, etc.

### ***Holland Center***

The Holland Center is located in Minnetonka, Minnesota. It offers therapeutic and biomedical interventions, consulting and assessment services, and educational opportunities for parents, educators, therapists, and service personnel. Their therapeutic interventions include applied behavior analysis as well as applied verbal behavior. They also offer speech language services, occupational therapy, and music therapy. Biomedical services include medical consulting, hyperbaric oxygen therapy, nutrition consulting, and food and allergy testing.<sup>118</sup>

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<sup>117</sup> National Autism Center, "Our Facilities," <http://www.nationalautismcenter.org/about/facilities.php> (accessed March 9, 2011).

<sup>118</sup> Holland Center, "Holland Center Programs Overview," <http://www.hollandcenter.com/programs.php> (accessed February 28, 2011).

The Holland Center carries its philosophy of autism treatment to its facility, which is a chemical free and gluten/casein free environment. They attempt to eliminate chemicals by using only non-toxic cleaning products; steam cleaning toys and rooms; requiring all staff and visitors to remove their shoes or wear center-only shoes; using non-VOC paint and antibacterial flooring; and not using treated lumber. In terms of daily operation, the facility is gluten, casein, and peanut free, and lunch and snacks are made to the specification of each child's diet. The staff is also trained to administer medications and supplements.<sup>119</sup>

The Holland Center is another facility that has combined behavioral treatments with biomedical interventions. In addition, by offering music therapy, along with food and allergy testing, they provide some services that are not normally found in autism treatment centers. And providing educational opportunities for the community is commendable. However, the center lacks alternative behavioral therapies, and falls short in the area of providing family support services.

### ***Lakeside Center for Autism***

The Lakeside Center for Autism, located in Issaquah, Washington (just outside of Seattle), offers an excellent model of a diverse educational-based facility. They provide assessment and early intervention for children with autism. The Lakeside Center provides primarily developmental therapy; however, unlike most other facilities, they offer a full range of therapeutic interventions. These include applied behavior analysis,

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<sup>119</sup> Ibid., "Chemical Free and Gluten/Casein Free Facilities," <http://www.hollandcenter.com/programs.php> (accessed February 28, 2011).

verbal behavior intervention, DIR (floortime), RDI, SCERTS, TEACCH, and sensory integration therapy. In addition, they offer speech, physical, and occupational therapy; as well as social skills classes.<sup>120</sup> They even offer “Lego therapy” and pet therapy.<sup>121</sup>

The Lakeside Center also offers pre-school programs. The Lakeside Academy Preschool is for children with autism ages 3-5.<sup>122</sup> And based on the standard minimum recommendation of 25-30 hours of intervention per week for children with autism, they also offer extended school day services through the “Learning-Engagement-and-Attending through Play” (LEAP) program.<sup>123</sup> In both the preschool and the LEAP program, they integrate the various developmental therapies mentioned above. In addition, they provide parent training, to aid in the generalization of skills to the home and community.



*Figure 3.11: The Lakeside Center for Autism<sup>124</sup>*

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<sup>120</sup> Lakeside Center for Autism, “Our Services,” <http://lakesideautism.com/our-services> (accessed March 10, 2011).

<sup>121</sup> Ibid., “Other Therapies,” <http://lakesideautism.com/our-services/other-therapies> (accessed March 10, 2011).

<sup>122</sup> Ibid., “Preschool Programs,” <http://lakesideautism.com/preschools> (accessed March 10, 2011).

<sup>123</sup> Ibid., “The LEAP Program,” <http://lakesideautism.com/preschools/the-leap-program> (accessed March 10, 2011).

<sup>124</sup> Ibid., <http://lakesideautism.com/> (accessed March 10, 2011).



The Lakeside Center for Autism is a comprehensive educational facility, but offers no clinical and limited resource/support services. However, their open-minded approach to behavioral therapy, in order to tailor a program that best fits the child, is an idea that can be applied to all types of therapies for autism.

### ***Conclusions***

All of the facilities mentioned above are outstanding examples of multi-service autism treatment facilities. And although the lack of specific services was pointed out for each (when compared to our master list), in all fairness to the designers, the inclusion (or exclusion) of specific services is likely due to client desires, and/or funding and staffing constraints. Clearly, if the leadership of a facility does not endorse, for example, the biomedical treatment of autism, it will not include spaces such as a clinical lab, diagnostic x-ray, or a compounding pharmacy. Neither will it have areas for treatments such as hyperbaric oxygen therapy. And if it only endorses one type of behavioral therapy, it will not have rooms for alternative therapies. If they don't believe in dietary interventions, they will not have a place to sell food for special diets. Again, this forces the parents to look elsewhere for these alternative modalities, and makes it that much harder to tailor a treatment program for their child (which really should be done by professionals anyway). A holistic approach to the treatment of autism, offering all types of therapies, is clearly in the best interest of the patient and the families.

These facilities, as well as others not discussed here, show that efforts have been made to combine services, in order to simplify access to those services for patients with

autism and their families. But when a comparison is made to the vast array of services outlined earlier in this report, it can be seen that none of these facilities are truly comprehensive (see Table 3.1). It is the intent of this project to identify all services in a planning, programming, and design guide that will assist clients and designers towards creating more comprehensive facilities, based on their particular needs and budgets. With such a tool, facilities can be designed that provide a truly holistic approach to the treatment and support of autism.

		MIND Institute	Hope Network's Center for Autism	KIDA	Integrative Hyperbaric Centers	Rimland Center	National Autism Center	Holland Center	Lakeside Center for Autism
Educational	Applied Behavior Analysis		X	X	X		X	X	X
	Applied Verbal Behavior							X	X
	Pivotal Response Training								
	TEACCH								X
	DIR (Floortime)								X
	RDI								X
	SCERTS								X
	Art/Music Rooms						X		
	Daily Living Skills		X	X					
Clinical	Medical Practitioners	X	X			X			
	Bio-Medical				X	X		X	X
	Speech Therapy		X	X	X	X	X	X	X
	PT/OT/Sensory Gyms	X	X	X	X	X	X	X	X
	Pharmacy								
	Clinical Laboratory					X			
	Diagnostic Imaging								
	Dental		X						
Nutrition/ Other	Nutrition							X	
	HBOT				X			X	
	Music Therapy							X	
Support	Counseling		X						
	Legal Assistance								
	Chapel								
	Library/Bookstore	X					X		
	Cafeteria/Grocery Store						X		
	Education & Training						X	X	X
	Computer Lab		X				X		

Table 3.1: Comparative Services

## **CHAPTER 4: CASE STUDIES**

*‘A’ohe pau ka ‘ike i ka halau ho’okahi (All knowledge is not taught in one school; it comes from many sources) - Hawaiian proverb*

As mentioned throughout this report, the goal behind the creation of comprehensive autism, treatment, resource, and support centers is to improve patient outcomes by providing a holistic, family-centered model of care. This methodology has been successfully implemented with other medical conditions. In this section, we will examine the Cancer Treatment Centers of America and the National Intrepid Center of Excellence, and how these facilities were designed to provide environments that accommodate the holistic, family-centered approach.

In addition, a case study of a local family affected by autism is presented. This will chronicle their personal “autism journey,” and provide insight into what families face, particularly here in Hawaii. We’ll hear directly what they feel would be beneficial in a comprehensive center.

### ***Cancer Treatment Centers of America***

The Cancer Treatment Centers of America (CTCA) is a network of cancer treatment hospitals and facilities that is based on the concept of integrative cancer care – a comprehensive and integrative approach to treating cancer, with all services provided under one roof. CTCA combines traditional cancer treatments with complementary therapies. Their commitment is to use every available resource to treat

the whole person, not just the disease, using leading-edge medical technology as well as innovative medical therapies.<sup>125</sup>

Conventional cancer treatments offered at CTCA include the following:<sup>126</sup>

- Chemotherapy
- Radiation therapy
- Surgery
- Gastroenterology
- Hormone therapy
- Immunotherapy
- Interventional pulmonology
- Interventional radiology
- Stem cell transplant therapies

In addition, the following complementary therapies are offered:<sup>127</sup>

- Nutrition therapy
- Naturopathic medicine
- Pain management
- Oncology rehabilitation
- Mind-body medicine
- Spiritual support
- Acupuncture
- Chiropractic care
- Image enhancement
- Survivorship support

CTCA operates under the philosophy of “Patient Empowerment Medicine.” This patient-centered approach means that they educate and empower the patient and caregivers to actively participate in the treatment decisions. A multi-disciplinary team

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<sup>125</sup> Cancer Treatment Centers of America, “Integrative Cancer Treatment,” <http://www.cancercenter.com/integrative-treatment.cfm> (accessed March 15, 2011).

<sup>126</sup> Ibid., “How We Treat You,” <http://www.cancercenter.com/conventional-cancer-treatment.cfm> (accessed March 15, 2011).

<sup>127</sup> Ibid., “How We Support You,” <http://www.cancercenter.com/complementary-alternative-medicine.cfm> (accessed March 15, 2011).

of experts meets with the patient to explain what role they can play in the treatment. Providing clear, well-defined choices helps the patient decide on a treatment plan that best suits their individual needs. And if the patient desires, family members are fully involved in this process as well.<sup>128</sup>



*Figure 4.1: Patient Empowerment Medicine puts the patient at the center of the care team.*<sup>129</sup>

<sup>128</sup> Ibid., "Our Philosophy," <http://www.cancercenter.com/about-us/philosophy.cfm> (accessed March 15, 2011).

<sup>129</sup> Ibid., "Integrative Cancer Treatment," <http://www.cancercenter.com/integrative-treatment.cfm> (accessed March 15, 2011).

Patient empowerment can help the cancer patient feel more in control of their life; make informed decisions about their care; choose the treatments they are most comfortable with; and feel more hopeful through being empowered.<sup>130</sup> And having hope is the first step in maintaining a positive attitude, which in turn provides the foundation for the physical strength required to wage a successful battle.

Closely tied to the philosophy of patient empowerment medicine is that of “Patient Empowered Care.” This means bringing the medical oncologist, clinical nurse, registered dietician, naturopathic oncology provider, and nurse care manager to the patient, providing greater comfort, convenience, and privacy while the patient meets with their care team in one room. Again, this allows patients to feel more in control of their treatment, as all of their questions are addressed in a single visit. Patient empowered care results in greater efficiency, added convenience, less stress, and less wasted time.<sup>131</sup>

Patient empowered care means appointments with your treatment team are sequential and occur in one room. The providers come to the patient, one right after another, for a seamless visit. They meet as a team that same day to review and discuss the treatment plan. In addition to the team members mentioned above, patients can also meet with additional providers, as needed and desired.<sup>132</sup>

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<sup>130</sup> Ibid., “Our Philosophy,” <http://www.cancercenter.com/about-us/philosophy.cfm> (accessed March 15, 2011).

<sup>131</sup> Ibid., “Patient Empowered Care,” <http://www.cancercenter.com/patient-empowered-care.cfm> (accessed March 15, 2011).

<sup>132</sup> Ibid.

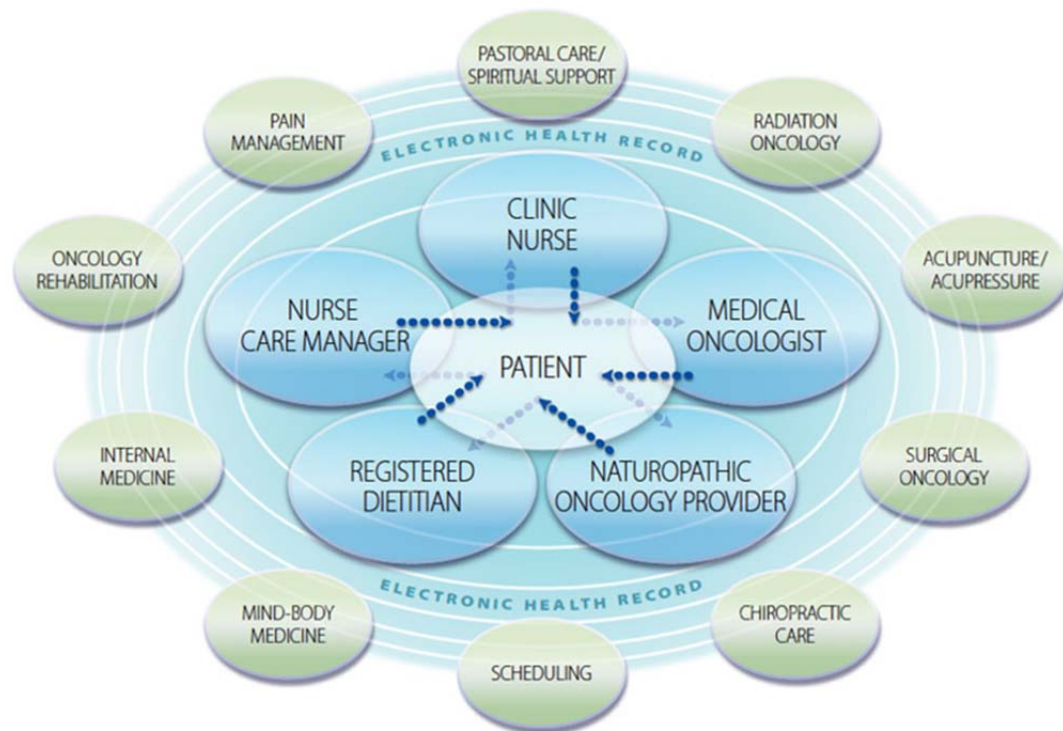


Figure 4.2: Patient Empowered Care<sup>133</sup>

The integrative care approach of CTCA appears to result in better outcomes for cancer patients when compared to national averages. According to the CTCA web-site,

“Most cancer treatment hospitals do not publish patient survival rates and a national program that compares the quality of cancer care of multiple hospitals doesn’t exist. However, the National Cancer Institute collects information on cancer incidence and survival across the United States and periodically provides that information to the public through its Surveillance, Epidemiology, and End Results (SEER) Program.”<sup>134</sup>

<sup>133</sup> Ibid.

<sup>134</sup> Ibid., “Breast Cancer Survival Statistics and Results,” <http://www.cancercenter.com/breast-cancer/survival-outcomes.cfm> (accessed March 15, 2011).



CTCA engaged an independent, third party biostatistician to compare survival rates experienced by cancer patients who were treated at CTCA with similar data reported in the SEER Program.<sup>135</sup> This was done for several types of cancer; for illustrative purposes, the results of the comparison for breast cancer and prostate cancer are shown here.

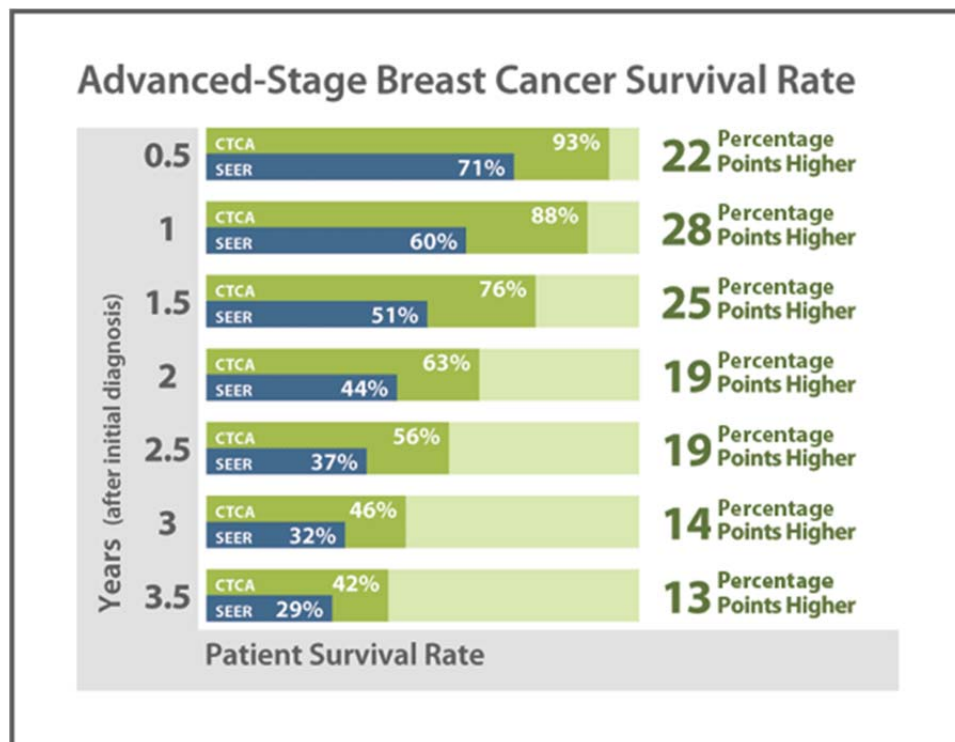
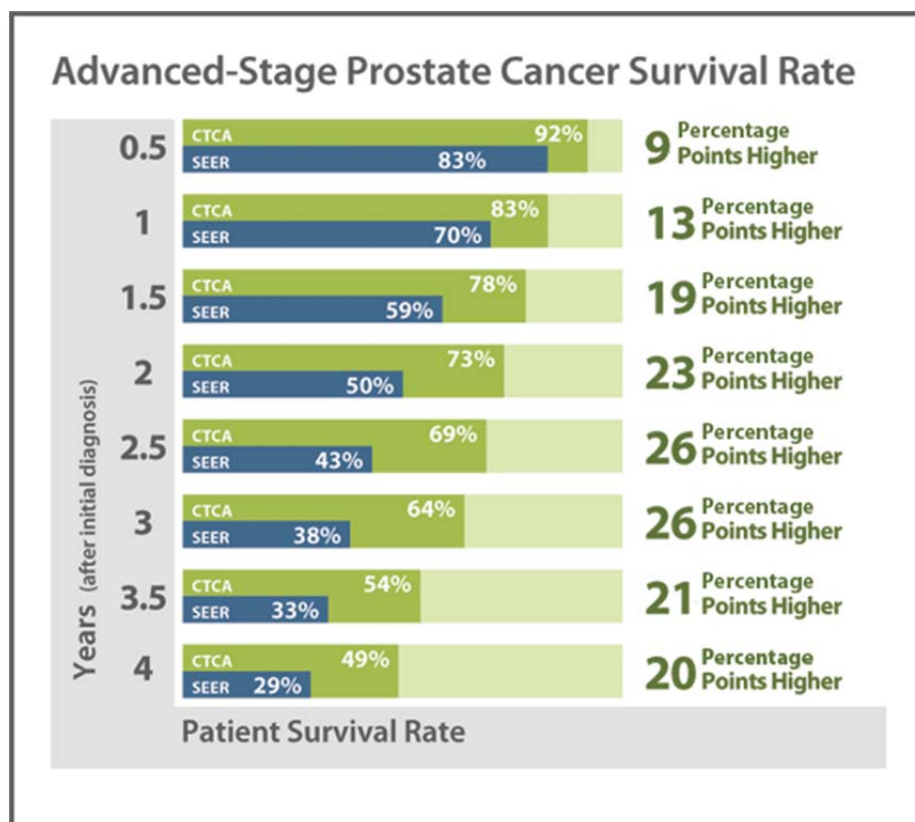


Figure 4.3: Breast Cancer Survival Rate Comparison<sup>136</sup>

<sup>135</sup> Ibid.

<sup>136</sup> Ibid.



*Figure 4.4: Prostate Cancer Survival Rate Comparison<sup>137</sup>*

In addition to survival statistics, CTCA also tracks patient experience statistics and results compared to national averages. Based on the “Likelihood of recommending CTCA to another patient after treatment,” 93% of breast cancer patients and 96% of prostate cancer patients were willing to recommend CTCA (based on 2007 results).<sup>138</sup>

<sup>137</sup> Ibid., “Prostate Cancer Survival Statistics and Results,” <http://www.cancercenter.com/prostate-cancer/survival-outcomes.cfm> (accessed March 15, 2011).

<sup>138</sup> Ibid., “Breast Cancer Patient Experience Statistics and Results,” <http://www.cancercenter.com/breast-cancer/patient-satisfaction.cfm>, and “Prostate Cancer Patient Experience Statistics and Results,” <http://www.cancercenter.com/prostate-cancer/patient-satisfaction.cfm> (accessed March 15, 2011).

This compares to a 55% national hospital average of patients who are willing to refer another patient.<sup>139</sup> Similar results can be seen for other types of cancer.

The extent that the physical environment plays in the improved outcomes of patients at the CTCA is debatable. However, it is clear that the CTCA philosophy has directly influenced the design of their facilities. For example, the CTCA in Goodyear, Arizona, designed by the Tulsa, Oklahoma office of PSA-Dewberry, was specifically designed to support the mission of providing patient-centered, integrated care. It features “multi-organizational service units,” which are inpatient rooms that are capable of transforming into intensive care rooms. This eliminates the need to transfer patients from room to room when their condition changes. To accommodate this, nursing stations are decentralized to work stations located outside each patient room.<sup>140</sup>

The patient rooms are also larger than normal, to accommodate family-centered care, with a family zone that allows overnight stays. Another design feature is streamlined clinical configurations, which reduce travel distances for both patients and staff. This reflects the philosophy of scheduling appointments so that the patient stays in one exam room.<sup>141</sup>

The CTCA in Tulsa, Oklahoma, was also designed by PSA-Dewberry, and is based on the same concepts of bringing the services to the patient, rather than requiring the

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<sup>139</sup> Julie Coffman and Phyllis Yale, “Would You Recommend This Hospital to a Friend?” Bain & Company Brief, 2007, [http://www.bain.com/bainweb/PDFs/cms/Public/Would\\_you\\_recommend\\_this\\_hospital\\_to\\_a\\_friend\\_BB.pdf](http://www.bain.com/bainweb/PDFs/cms/Public/Would_you_recommend_this_hospital_to_a_friend_BB.pdf) (accessed March 19, 2011).

<sup>140</sup> Dewberry, “New CTCA at Western Regional Medical Center Complete in Arizona,” <http://www.dewberry.com/news.asp?id=1205> (accessed March 15, 2011).

<sup>141</sup> Ibid.

patients to travel throughout the building. Both the Goodyear and the Tulsa facilities also feature on-site residential accommodations to allow outpatients to remain on campus with their families for extended periods.<sup>142</sup> The photos below are of the Tulsa CTCA facility, and are indicative of the warm, inviting atmosphere that is typical in CTCA facilities, and which reflects the philosophy of patient-centered care.



*Figure 4.5: Cancer Treatment Center of America, Tulsa, Oklahoma<sup>143</sup>*

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<sup>142</sup> Ibid.

<sup>143</sup> Flintco Constructive Solutions, "Cancer Treatment Centers of America," <http://www.flintco.com/experience/healthcare/cancer-treatment-centers-of-america.aspx> (accessed March 15, 2011).

### ***National Intrepid Center of Excellence (NICoE)***

While the physical environment of the CTCA facilities seems to have been a natural development stemming from the outgrowth of the holistic care concept, the National Intrepid Center of Excellence (NICoE) was intentionally designed to accommodate the very same concept from its inception. The NICoE, located at the National Military Medical Center in Bethesda, Maryland, is designed to advance the research, diagnosis, and treatment of traumatic brain injury (TBI), post traumatic stress disorder (PTSD) and other complex psychological health issues.<sup>144</sup> The holistic approach to care at the NICoE addresses the spiritual, physical, emotional, and psychological health of not only their patients, but their families as well.<sup>145</sup>

Some of the guiding principles of the NICoE include the following:<sup>146</sup>

- An interdisciplinary approach to care that leverages pattern recognition of physical, behavioral, social, and spiritual conditions.
- A family-centered approach to care that emphasizes cooperative planning among providers, patients, and their family members.
- A commitment to the use of a holistic platform in concert with advanced scientific technology.

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<sup>144</sup> Smith Group, "Intrepid Center of Excellence," <http://www.smithgroup.com/?ID=1591> (accessed March 3, 2011).

<sup>145</sup> U.S. Medicine, "NICoE Offers Holistic Approach to Psychological Care," *U.S. Medicine*, Jan 2011, <http://www.usmedicine.com/articles/nicoe-offers-holistic-approach-to-psychological-care.html> (accessed March 3, 2011).

<sup>146</sup> William I. Kline, Lora Schwartz, Frederick Foote, and George Nussbaum, "Architecture That Heals the Whole Person, Not Just the Disease," presentation given at the Healthcare Design 2010 Conference, Las Vegas, Nevada, November 15, 2010.

Putting holistic care into practice at the NICoE means not only multidisciplinary care integration and patient/family-centered care, but also “wellness” interventions (nutrition, exercise, complementary and alternative medicine, healing arts, and spirituality), and the use of the built environment through evidence-based design.<sup>147</sup> Merging evidence-based design theories with neurological studies, every building element is attuned to the special sensory and wayfinding needs of TBI patients. The way that patients interact with the physical environment was the key to every design decision, ranging from lighting and acoustics to privacy and safety. The result is a warm and inviting space that communicates healing and hope.<sup>148</sup>

The NICoE is designed to accommodate multiple programs and functions co-located under one roof. These include:<sup>149</sup>

- Physical therapy
- Occupational therapy gym
- Gait Lab
- Outdoor rehabilitation space
- Vocational rehabilitation space
- Vehicle simulator
- Speech, hearing, and sight rehabilitation
- Virtual reality room/firearm simulator
- Sleep lab
- Audiology lab
- Ophthalmology lab
- Vestibular lab
- Music and art therapy

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<sup>147</sup> Ibid.

<sup>148</sup> Smith Group.

<sup>149</sup> Ibid., U.S. Medicine, and Fallen Heroes Fund, “The National Intrepid Center of Excellence for Traumatic Brain Injury and Psychological Health,” <http://www.fallenheroesfund.org/getdoc/6b1b139f-47c4-4073-8b5a-dc6efc5c6213/nicoebrochure.aspx> (accessed March 3, 2011).

- Advanced diagnostic imaging
  - CAREN (Computer Assisted Rehabilitation Environment) system
  - Magnetic Resonance Imaging (MRI)
  - Positron Emission Tomography/Computed Tomography (PET/CT) Scan
  - Magnetoencephalography (MEG) Scan
  - Ultrasound Transcranial Doppler
- Support spaces
  - Multimedia conference rooms
  - Family Lounge
  - Café
  - Activity Center

In addition, there are two Fisher Houses located by the NICoE (Fisher Houses are the military equivalent of Ronald McDonald Houses). Patients and their families come for two weeks to the NICoE, and stay in one of the Fisher Houses. During this time, they are evaluated, and receive a comprehensive and individualized treatment plan, that they then continue with their home provider.<sup>150</sup> They also receive life-long follow-up from the NICoE. Also during their stay, family members are trained as coaches in nutrition, exercise, substance abuse, and mind/body medicine.<sup>151</sup>

I had the opportunity to interview Ms. Brenna Costello from the SmithGroup (SmithGroup Architecture, Engineering, Interiors, Planning) in a telephone conversation on March 18, 2011. Ms. Costello was a member of the design team for the NICoE. It was evident from our conversation that extraordinary efforts were made to design the NICoE in accordance with the guiding principles of the Center's mission. Providing an environment that is conducive to patient and family-centered care, while

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<sup>150</sup> U.S. Medicine.

<sup>151</sup> Kline, et al.

accommodating the latest technologies, was a challenge that was met with great success.

With regard to focusing on the patient, Ms. Costello pointed out the “Teaming Pods.” This is the intake area, where a patient and their family are initially assessed. These pods are conveniently located in the center of the clinic. Here is where the patient tells their story, one time, to their treatment team. These spaces are set up for tele-health, so outside specialists can be consulted via teleconferencing, as required by a particular patient.

The design team provided extensive accommodations for families. There are three “family zones” in the NICoE. These are primarily respite areas, although they do serve additional purposes. For example, one of the family “respite” spaces is also a diagnostic area, where therapists can observe the interactions of patients with their family members. There are also “quiet areas” located in each clinical area, for any time a patient needs a break from treatment. Finally, there is the “Central Park.” This large, open area in the center of the facility has become the focus of the entire building. It is covered by a grand skylight, and was designed as a respite area. However, it is also used for physical therapy, as well as yoga classes, among other things. And although there is a small chapel provided in the building, the Central Park has become the more “spiritual” space.





*Figure 4.6: Central Park<sup>152</sup>*

In addition to these three zones, there are additional spaces that cater to the overall well-being of the patient and family. There is the outdoor playground/recreation area; a room for art and music therapy; and a business center. And although not a room or space, a particularly nice touch is having a teacher on the staff, so that children do not fall behind on their school work during the family's two-week stay.

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<sup>152</sup> Ibid.



Figure 4.7: Patient/Family Respite Areas – Café with Internet Access (left); Lounge with Reading Area (right)<sup>153</sup>



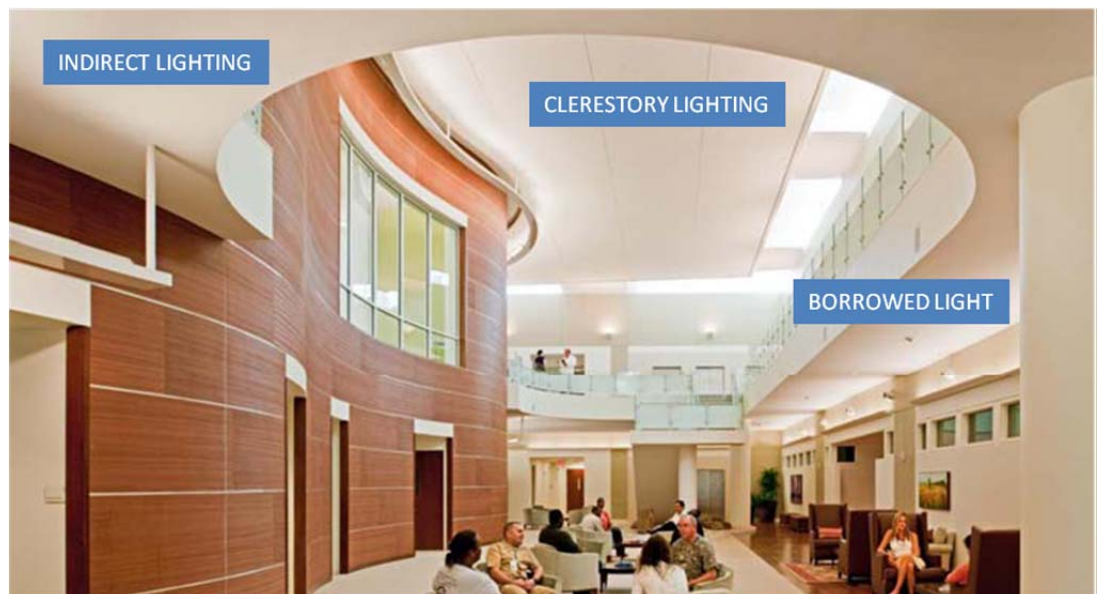
Figure 4.8: Music and Art Therapy Room<sup>154</sup>

<sup>153</sup> Ibid.

<sup>154</sup> Ibid.

Some of the specific design features pointed out by Ms. Costello include:

- The importance of exterior views, to identify where you are in the building.
  - An emphasis on natural light, and the use of indirect lighting where artificial lighting is used, in order to provide the “warm glow” throughout the building.
- Borrowed light is provided in all patient spaces through the use of transoms over the doors.



*Figure 4.9: Lighting Strategies for the Sensory Impaired<sup>155</sup>*

- All of the spaces around the perimeter of the building have a raised ceiling, to provide a sense of openness.
- Duress alarms are provided in all rooms where there is one-to-one interaction between staff and patients.

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<sup>155</sup> Ibid.

- A white noise system is provided in the inner lobby to mask out undesirable noise.
- Carpet is provided in all family areas for improved acoustics.
- Artwork is all based on scenes from nature; there are no people shown in any of the pieces.
- A daily life skills space was provided in the form of a small apartment. This space is intentionally non-ADA compliant, so patients can work to develop fully functional skills.

As listed earlier, the NICoE has several advanced imaging systems. I asked Ms. Costello if these systems are fully utilized by the relatively small patient base at the NICoE, because from a business standpoint, utilization rate is a concern I have with providing extensive ancillary services in an autism treatment, resource, and support center. The imaging systems at the NICoE are in fact utilized by the inpatient Traumatic Brain Injury facility across the street. This points to the possibility of including required functions, but also making them available to other organizations, to ensure full utilization. This is a business case analysis for how all required services can be provided under one roof. From a design standpoint, it suggests the possibility of separate entrances, or specific orientation of the space to serve multiple customers.

The emphasis on family-centered care, treatment teams, and providing complementary medicine in addition to traditional modalities, obviously comes at a

premium. It is estimated that the NICoE is 30% larger than comparable facilities in order to accommodate this approach.<sup>156</sup> However, the resounding success that the NICoE has been is testament to the fact that the up-front investment was well worth the price.



*Figure 4.10: NICoE, Main Entrance<sup>157</sup>*

As can be seen, both the CTCA and the NICoE endorse the concept of holistic, family-centered medicine, a concept that is worthy of emulating in autism treatment, resource, and support centers. And they both clearly show the benefit of providing all services in one location.

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<sup>156</sup> Kline, et al.

<sup>157</sup> Ibid.

We will now take a look at what a family in Hawaii typically must go through to access autism-related services. This will serve as a contrast to the experience that patients and families have at CTCA and NICOE, and provide the backdrop for the need of similar facilities for autism.

### ***A Local Family Affected by Autism***

In selecting a family for this interview, the primary criteria was that they had tried as many of the autism resources outlined in this report as possible – various behavioral therapies, biomedical interventions, special diets, consultations with a wide range of medical specialists, legal support, etc. The more resources the family had tried, the better idea we would have as to their availability (or lack thereof) here in Hawaii.

To ensure the confidentiality of the family, real names are not used. We will refer to this family simply as the “Smith” family, and their child with autism will be called “Bobby.”

The Smith family was interviewed on March 18, 2011. The parents had noticed some things they felt were odd about Bobby’s behaviors while he was still a baby. For instance, he would not look at himself in a mirror like most babies, and would not squeeze your finger if you placed it in his hand. At the time, however, no thought was given to anything being really wrong with Bobby. He met several milestones on-time or ahead of schedule (he began walking when he was 10 months old), and just seemed like a quiet boy. Between his first and second birthday, however, it became apparent that something may in fact be wrong. Bobby seemed to be in his own world, and would



often run around the living room laughing hysterically for no apparent reason. He was still not sleeping through the night, and always had diarrhea regardless of what he ate. His speech did not seem to be developing, either, as all he ever said was “Ah! Ah! Ah!” Of course, the standard response from his pediatrician was that “he’s a boy; boys take longer to start talking.” This is a line that Bobby’s parents would continue to hear over the next several months.

As the months passed, Bobby exhibited more behaviors, including self-injurious behaviors (SIB), particularly banging his head on the ground when he was frustrated. It had become apparent that something was indeed wrong, and Bobby’s parents were referred to the state Department of Health’s Early Intervention Program, for ages 0-3. They were put in touch with the local Easter Seals, who was the contract provider for the 0-3 program. This is when the Smith’s “journey” began in earnest. The Easter Seals personnel began to arrange for the numerous assessments that would determine his condition, as well as what services and supports he would be entitled to. Bobby’s mother asked that if it was indeed autism, were there any support groups on the island, or anywhere they could turn to for information and support? The case workers simply shrugged their shoulders; little did the Smiths know that this one simple gesture would be a harbinger for what lied ahead.

Some of the assessments took place at the Easter Seals office; some took place in the Smith’s home; and some took place at school (Bobby was in a local preschool, and the staff there had been complaining about his behaviors, and how he required too

much attention from the staff). Some assessments were simply observations, and some were interviews with Bobby's parents. Various personnel administered these assessments, but it was the ones done by the clinical psychologist that would deliver the news that would change the Smith's lives forever – "Your son has autism."

It was shortly before Bobby's second birthday when they received this news. And while it was devastating news indeed, it was also a relief to finally have a diagnosis for Bobby's condition. With this, the Smiths could formulate a plan – they now knew what to research to try and figure out what to do. Bobby's mother took on this challenge with a determination and zeal that was almost inhuman. She began to do research, network, and learn as much as she could about everything related to autism. Many late nights were spent in front of the computer, scouring the internet for any and all information available. The internet became the primary source of information, as it became clear that the services in Hawaii were limited. This continues to be a constant source of frustration for the Smiths.

While Mom was doing the research, Dad tried to pick up the slack on the home front. This arrangement would inevitably lead to a very stressful situation that would continually test the strength of their marriage. But they would continue to fight through for the sake of Bobby.

Through Easter Seals, limited behavioral interventions were implemented. Bobby was assigned a skills trainer, who would accompany him at pre-school. Overseeing the skills trainer was a Behavior Intervention Support Specialist (BISS).



These two workers would sometimes come to Bobby's house for a couple of hours on Saturday. It became evident early on that the skills trainer was not very "skilled" at her craft, and essentially functioned as more of a baby-sitter than anything else. This was the Smith's first experience with what would be a recurring problem. Through research and painful experience, they learned of the extreme shortage of skills trainers, and how the agencies that supplied these personnel couldn't hire them fast enough to keep pace with the rise in autism, let alone take the time to properly train them (despite their claims otherwise). As the Smiths began to network with other families through local support groups, they learned that everyone was having the same problem of finding qualified skills trainers. To exacerbate the problem, most agencies do not provide any benefits to these workers, on top of low pay, so retention is a major issue. It is a common occurrence for a skills trainer to leave a case just when they have received enough training and built enough rapport with the child to be effective. Each time this happens, a new skills trainer must be found, be trained, build rapport, etc. In the meantime, it is the child that suffers.

Through her diligent efforts, Bobby's Mom learned of the Pacific Autism Center (PAC) in Kakaako. Here was a place that offered applied behavior analysis, in a controlled setting, by a qualified team of therapists. However, PAC, like all private ABA providers, is extremely expensive (~\$9K-15K per month) and not covered by insurance, so it was not feasible for the Smiths to pay for it on their own. But they asked the DOH if they would send Bobby to PAC, and to their surprise, they agreed.

Bobby was 2 years and 3 months old when he began at PAC. For the next nine months, Bobby received intensive behavioral therapy. He typically spent his mornings at PAC doing discrete trial training drills, and in the afternoon his skills trainer would go to his preschool to conduct natural environment training. They would also come to Bobby's home on Saturday mornings. As it turned out, Bobby was quite a bright boy and learned quickly. He mastered his drills and progressed through the various levels of his program. It was clear he had a lot of knowledge in his head, and was now learning how to express that knowledge with words.

While the behavioral therapy was on-going, Bobby's Mom continued her research on related conditions, alternative therapies, and the like. She began to understand that autism wasn't simply a neurological disorder, but also a physiological condition that manifested itself in many different ways, not the least of which is gastrointestinal disorders. Bobby's Mom learned about DAN! doctors and bio-medical treatments, special diets, HBOT therapy, and all of the other treatments outlined earlier in this report. Working in the health care field herself, she brought a keen sense of understanding to the entire process. This would prove to be invaluable as they began to confer with various specialists, analyze lab tests, and attempt to create an overall treatment plan that would address all of Bobby's symptoms, because while the behavioral therapy at PAC seemed to be going well, Bobby still had many other issues. He still could not sleep through the night, and would typically wake up screaming and crying at around 2 a.m. It would take Bobby's parents about 30 minutes to calm him

down, at which time he was wide awake. So they would play with him for two or three hours until he finally fell back asleep. This happened virtually every night.

Another problem was Bobby's continual loose stools. It seemed no matter what they fed him, he had diarrhea. Additionally, while Bobby's behaviors were improving in general, he would still have violent outbursts and bang his head on the wall, floor, table, or whatever was available.

Bobby's Mom suspected that a bio-medical treatment regimen, coupled with a gluten-free/casein-free (GFCF) diet, might successfully complement his behavioral therapy and improve these conditions. So the next step was to consult a DAN! doctor. Not surprisingly, there were none to be found in Hawaii. Through another parent, Bobby's Mom learned about Dr. Mary Megson, a DAN! doctor who is based in Virginia, but would come to Hawaii about two times a year to assess kids here. During her next visit, they were able to get an appointment for Bobby. Dr. Megson set up a bio-medical treatment regimen tailored for Bobby, consisting primarily of nutritional supplements. She also ordered a battery of lab tests, the results of which would be used to adjust and fine-tune the regimen. However, these lab tests were very specialized, and many could not be accomplished in Hawaii. Most of the blood tests could be done at Kapiolani Women's and Children's Center Hospital, but there were urine and stool tests that had to be collected at home and sent to labs in the mainland, and a hair test that had to be sent to a lab in France! This proved to be quite a hassle, and having to send samples to labs outside of Hawaii meant inevitable delays in receiving the results. And what's

more, this was not a one-time deal — these labs must be re-accomplished at regular intervals so that the bio-medical treatments can be adjusted accordingly.

At any rate, once the bio-medical protocol was implemented, along with the GFCF diet, Bobby's conditions began to improve. Finally, after nearly two and a half years, Bobby could sleep through the night (and so could his parents!). And his stools became more normal. His head-banging, while still a problem, seemed to happen less often as well.

But there would be problems with accessing the services of DAN! doctors. Dr. Megson came under scrutiny for practicing in Hawaii, so she stopped making trips here. Consultations by phone were problematic to begin with, but that was now the only alternative. The Smiths ended up going through two more DAN! doctors in an effort to get timely services, with mixed results. They are now using a doctor based in Oregon, who like Dr. Megson before, comes to Hawaii periodically to see patients. But it would obviously be much better if there was a DAN! doctor here in Hawaii.

Things seemed to be going well, as Bobby was making improvements on many fronts. But he was approaching his third birthday, and that meant that the responsibility for his services would transfer from the Department of Health to the Department of Education (DOE). This is when the Smiths say their "nightmare" began. Having gotten involved with the local support groups and network of families affected by autism, they heard many "horror stories" about experiences people had with the DOE. Bobby was doing well at PAC, and the team there felt he needed one more year in

that setting before he was ready for a school environment. But with little chance that the DOE would let Bobby stay at PAC (due to the cost), there seemed to be little choice in the matter. The Smiths simply could not afford PAC, and again, applied behavior analysis services are not covered by insurance in Hawaii. Some people recommended to them that they leave Bobby at PAC and fight the DOE in court through “due process.” In hindsight, this may have been their best course of action. But at the time, they reluctantly decided to see what the DOE could offer. It was evident that the entire transition process was flawed, because even though their first meeting with the DOE was a full seven months prior to Bobby’s third birthday, they still were not ready for him until a month after.

The DOE, of course, did all of their own assessments, some of which were of questionable quality, and offered a program which appeared terrific on paper. They would provide a similar program and equivalent hours to what Bobby was receiving at PAC. They contracted with the Center for Autism and Related Disorders (CARD) to oversee the program development and provide staff training. Bobby went into the special education pre-school classroom of the local elementary school, where the school had set up an isolated space for Bobby to do his drills. It all looked good.

However, nowhere is the lack of qualified skill trainers mentioned earlier felt more acutely than in the DOE. This was a constant irritant for the Smiths. Not only their lack of qualifications, but having only one assigned at a time (rather than a team of skills trainers) meant that whenever a skills trainer was “sick” (which was often), Bobby would

get a substitute. This was inevitably a last-second scramble to find anyone that was available, and was always someone that didn't know Bobby or his program. The result was simply baby-sitting, or at best going over old drills that Bobby had long-since mastered. This eventually led to Bobby losing skills that he had when he left PAC.

This situation was intolerable for the Smiths, and they eventually pulled him out of the DOE when he was four. Again through her networking, Mrs. Smith discovered a small pre-school that worked with autistic children, and was able to get Bobby enrolled there when an opening became available. This was expensive as well (though not as expensive as PAC), but Mr. Smith landed a second job to secure additional income (it should be noted that Mrs. Smith was working this entire time as well).

Bobby was in his new school for ten months, when they had to shut down for administrative reasons. This was a critical time for the Smiths – they did not want to return to the DOE, but had few other options. Mrs. Smith began to craft her own program. She persuaded his old pre-school to let him enroll there until he turned six. She hired an experienced BISS and skills trainer to work with Bobby on a daily basis. She hired an occupational therapist to work with him in the home and in community settings. And she worked the insurance system for all it was worth to secure services such as speech therapy, and to get as many labs and medications covered as possible. It is a truly herculean effort that continues to this day. Bobby is now in kindergarten, with the same support team, and continues to make progress.

To backtrack a bit, when the Smiths faced this critical juncture when his school closed, they were forced to explore all options, including a possible return to the DOE as a “last resort.” Bobby again went through the battery of assessments, and a program was proposed. It was clear, however, that enrollment in the DOE would have the same result as before. At this point the Smiths sought legal advice. Here they faced another limitation – a shortage of lawyers in Hawaii with expertise in special education law. There are about four total that work in this area. And each one seems to take a different approach as to how they handle cases, so you really must consult with each one to get the full picture, and then decide which approach is best. The Smiths went with a particular lawyer who concentrates on identifying technical flaws in the students’ Individualized Education Plan (IEP), which it seems virtually all of them have. The Smiths successfully prevailed in their initial case against the DOE, gaining reimbursement for private placement services. But reimbursement from the DOE is a slow process, with no statutes regarding timely payments, so the Smiths have had to tap into their retirement savings in order to cash-flow the costs. Indeed, the effects of autism are far-reaching.

All the while this was occurring on the educational front, the Smiths continued with complementary and alternative therapies, including bio-medical treatments and the GFCF diet (which is also quite expensive!). With regard to the bio-medical, many of the medications and special supplements are not available in Hawaii and must be ordered from the mainland. Other medications can only be formulated at a “compounding pharmacy,” of which there is one on Oahu – Medical Center Pharmacy in

Aiea. And shopping for GFCE products can be difficult as well; these items are generally only found at organic grocery stores, such as Whole Foods in Kahala.

Another alternative therapy that the Smiths have tried is Hyperbaric Oxygen Therapy (HBOT). As documented earlier, there are two types of HBOT treatments – hard chamber and soft chamber. Hard chamber treatments are limited to one location on Oahu, in Kalihi. But the cost is \$135 for a one hour “dive,” and the minimum recommendation is 40 hours. So the Smiths got together with another family, took out a loan, and split the cost of a soft chamber. The families took turns keeping this chamber in their homes and treating their respective children. They eventually recouped their investment by selling the chamber to a local foundation, which now rents it out to local families.

Seeing some positive results with the soft chamber, the Smiths decided to do the hard chamber treatments as well, and did this for 40 dives (at their own expense, of course). Other therapies the Smiths have utilized include chelation, floor time, and music therapy (there is only one company on Oahu that provides music therapy).

As mentioned, autism has many related medical conditions that must be either ruled out or treated. Many specialists must be consulted to assess these conditions. This can lead to additional trips all over the island, or even to the mainland in some cases. Some of these specialists include gastroenterologists, developmental pediatricians, child neurologists, and geneticists, to name but a few. Even when these types of specialists are available in Hawaii, odds are they have little or no experience



with autism. Bobby's parents have in fact taken him to doctors all over Oahu, and to the mainland as well (California), for testing. The time and expense of these visits is significant. And of course, these visits often lead to further tests, such as diagnostic imaging, which must be arranged and accomplished elsewhere. Bobby has had to endure MRIs (under sedation) as well as CT scans.

Local support groups have been mentioned several times, but these groups are primarily informal gatherings of parents to exchange information. Several of the national autism organizations have Hawaii chapters, but they are essentially dormant. One exception is the local chapter of Talk About Curing Autism (TACA), which meets once a month and draws a good-sized crowd. Mrs. Smith was instrumental in the formation of this chapter three years ago, along with some other Moms. But TACA meetings are held in Kaimuki, so are not necessarily convenient for people from the windward or leeward sides of the island.

The Smith's journey, as outlined above, has obviously placed tremendous demands on them, which has resulted in significant stress and all that comes with it. And not that Hawaii is lacking in marriage counselors, but few, if any, have any experience with autism. This leaves basically the support groups and other parents to talk to, but they of course are not professional counselors. And unless the counselor is also the parent of a child with autism, they really can't begin to understand the situation.

Limited services. Running all over the island to access what services are available (not to mention getting food for special diets, finding a compounding pharmacy, etc. – see figure 4.11). Flying to the mainland for services. Fighting with the DOE for services. Watching their life savings quickly erode while they pray for insurance reform. Doing everything they can for their child while still trying to maintain their marriage. The Smith family has experienced all of these things and more. This brief narrative cannot adequately describe the ordeal that they continue to face. And the sad part is that theirs is a typical autism story.



Figure 4.11: Services on Oahu accessed by the Smith Family

The case of the Smiths highlights the shortcomings of services and supports for autism in Hawaii. If only the Smiths, and families like them, could access the majority of these services in a comprehensive center, their lives would be greatly enhanced. A place they could turn to for answers, rather than trying to find the answers all on their own. And with the prevalence of autism at 1 in 110 and rising, is it not clear the demand for these types of facilities, particularly here in Hawaii? The Smiths answer that question with a resounding “YES!”

### ***Conclusions***

It is fairly evident that the autism world can learn many lessons from the holistic, family-centered approach inherent in the Cancer Treatment Centers of America and the National Intrepid Center of Excellence. As pointed out in previous chapters, there is a wide range of services and supports available for autism, and there are some facilities that have brought various levels of these services together in one location. However, truly comprehensive centers for autism have not been seen yet, and the services in Hawaii are particularly scattered.

Furthermore, if someone wanted to create such a center, there is really no criteria assembled to guide the design team. Architects, who may or may not have experience in designing facilities for autism, simply work with the client on a project-by-project basis, re-creating the wheel each time. The intent of this project is to correct that shortcoming, while providing an example that will address the needs in Hawaii.

## **CHAPTER 5: DESIGNING FOR AUTISM**

*"Good design for students with special needs is good design for all."<sup>158</sup>*

-Clare L. Vogel

The literature that pertains to designing for autism is much more scarce than the literature about autism itself, which is not surprising. It seems that most of the coverage to date is in the form of articles, or single chapters in books that cover broader design issues associated with education. There are also some research papers that have addressed designing for autism.

The focus of these resources is centered around the specifics of the environment, and how that environment should be designed to accommodate the behavioral and sensory issues associated with autistic individuals. Many are specific to "classroom design," and list the key components that should be considered. There are also building system recommendations to accommodate the learning environment.

The following list is an attempt to show all of the salient design characteristics that are listed in the various resources. Table 5.1 at the end of this list provides for cross-referencing which characteristics are mentioned in which resource.

### ***Flexibility***

Flexibility in designing the environment helps to accommodate the individual needs of children.<sup>159</sup> Flexible and adaptable work spaces, that can be easily rearranged,

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<sup>158</sup> Clare L. Vogel, "Classroom Design for Living and Learning With Autism," *Autism-Asperger's Digest* (May-June 2008): 33.

should be able to transform on a moment's notice. Furniture that is easy to move, rolling shelving units, portable partition screens, and adjustable lighting can all contribute to the flexibility of the space.<sup>160</sup> Classrooms can also be divided by the use of folding partitions, although it can be difficult to achieve good acoustics with these.<sup>161</sup> Having flexible, multi-function spaces can also be beneficial in reducing the scope and cost of a particular project.

### ***Clarity and Order***

Complexity can cause stress, particularly to those with autism. An environment that provides a sense of clarity and order can be calming and easier to use, thereby reducing stress.<sup>162</sup> A clear layout and organization of spaces, simple forms, and no visual clutter can assist those with autism to perceive the built environment easily.<sup>163</sup>

### ***A Non-Threatening Environment***

A comfortable and non-threatening environment is important for controlling sensory stimulation.<sup>164</sup> The space should feel welcoming and foster encounters, communication, and relationships. These spaces should offer a sense of security, and

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<sup>159</sup> Rachna Khare and Abir Mullick, "Incorporating the Behavioral Dimension in Designing Inclusive Learning Environment for Autism," in *ArchNet-IJAR: International Journal of Architectural Research*, vol.3, issue 3 (2009): 52, [http://archnet.org/library/documents/one-document.jsp?document\\_id=10985](http://archnet.org/library/documents/one-document.jsp?document_id=10985) (accessed November 9, 2010).

<sup>160</sup> Vogel: 31.

<sup>161</sup> Christopher Beaver, "Designing for Autism," *Special Education Needs* (May 2010): 77.

<sup>162</sup> Simon Humphreys, "Autism and Architecture," *Autism London Bi-Monthly Bulletin* (February/March 2005): 6.

<sup>163</sup> Khare and Mullick: 50.

<sup>164</sup> Patricia A. Myler, Thomas A. Fantacone, and Edwin T. Merritt, "Eliminating Distractions," *American School and University* (November 1, 2003), [http://asumag.com/Construction/accessibility/university\\_eliminating\\_distractions/](http://asumag.com/Construction/accessibility/university_eliminating_distractions/) (accessed November 9, 2010).

use elements that can provide sensory input, such as beanbag chairs, stuffed couches, carpeting, swings, clay, and water.<sup>165</sup>

### ***Non-Distracting/Low Stimulation***

Non-distracting/low stimulation rooms serve to decrease sensory overload. A non-distracting room will be free of clutter and relatively odor-free. Non-essential materials should be eliminated, such as posters and disorderly signage. Screens and window shades can be used to block out temporary distractions. The classroom arrangement should contribute to the student's grasp of order and space.<sup>166</sup>

### ***Predictability***

Designs should provide a sense of continuity and predictability. This eases the transition as students move from space to space.<sup>167</sup> Buildings should be easy to navigate, and use signs, numbering systems, and clear views to build the sense of predictability. Students can be provided with environmental information through sight, smell, sound, and touch.<sup>168</sup>

### ***Proportion***

The "Golden Section" or "Golden Proportion," developed by the ancient Greeks, is a system of proportion based on a mathematical scale that is found abundantly in nature, and which humans find pleasing. Introducing this system of proportion into a

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<sup>165</sup> Vogel: 31.

<sup>166</sup> Ibid: 31.

<sup>167</sup> Myler, et al.

<sup>168</sup> Vogel: 32.

building can benefit all occupants, and particularly those with autism.<sup>169</sup> In addition, it is good practice to keep the one-to-one learning spaces intimately proportioned; for example, with low ceiling heights.<sup>170</sup>

### ***Safety***

Creating a safe environment is a multi-faceted issue with regards to autism. You obviously want a safe environment that reduces the risk of injury, so things like eliminating sharp corners and edges is necessary. But many children with autism also exhibit self-injurious behaviors, so it is important to take this into account when choosing materials and finishes. In addition, many kids with autism like to chew on non-edibles, so it is important to conceal wires, use materials that can't easily be broken off into bite-size chunks, etc.

Eliminating sharp corners and edges applies not only to walls, but to furniture, equipment, and playground items as well. The corners of whiteboard marker trays or windowsills are examples of typical hazards. Choosing soft materials when possible is also important, although this may come at the expense of durability. Carpeting is softer than tile, but has some drawbacks such as trying to keep it clean, and off-gassing when it is new. Rubberized flooring is appropriate in some areas. And drywall is preferable to masonry walls.<sup>171</sup>

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<sup>169</sup> Humphreys: 6.

<sup>170</sup> Myler, et al.

<sup>171</sup> Ibid.

Designers also need to pay attention to hazards such as loose wiring, open stairways, unscreened windows, loose flooring, toxic paints, etc.<sup>172</sup> These items pose hazards to all children, but particularly those with autism.

### ***Security***

Many children with autism are prone to elopement, and hence there is a need for a “secure perimeter.” Having secure boundaries is important to prevent the child that runs away from exposing himself to dangerous situations, like running into a busy street. How these boundaries are designed is important; having a subtle, natural, yet secure perimeter will not only allow the student to wander at ease, but also give more peace of mind to the staff.<sup>173</sup>

### ***Non-Institutional***

An environment that makes students feel they are “at home” in their surroundings will allow them to relax and thereby foster learning. Soft lighting and home furnishings can transform a typical classroom into a more cozy gathering place. Interesting textures, well-placed works of art, and plants and objects from nature can also contribute to this kind of atmosphere.<sup>174</sup> However, in creating a non-institutional atmosphere, one must be careful not to make the environment over-stimulating.

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<sup>172</sup> Vogel: 33.

<sup>173</sup> Humphreys: 7.

<sup>174</sup> Vogel: 33.



### ***Warm, Soft Colors***

Colors should be chosen that create a warm environment, one that is not overly stimulating.<sup>175</sup> Bright colors should be avoided; warm pastels are more appropriate in order to create a calm, low-stress environment.<sup>176</sup> A muted, subdued palette, and plain, un-patterned finishes are sensible choices.<sup>177</sup>

### ***Proxemics***

Proxemics deal with the amount of space people need, or “personal space.” Children with autism generally need more space. They can be more guarded about their personal space, and any infringement on that space can be seen as a threat.<sup>178</sup> It can be disturbing to be in a space with many others and with little room to move.<sup>179</sup> Therefore, spaces should be designed as large as possible, within reason of course. This will obviously increase the budget of a project, but needs to be considered a priority.

Extra space is also required because the majority of children with autism have a one-to-one aide that assists them throughout the day, so these extra bodies must be accounted for. This can be particularly important in areas such as toilets, where the

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<sup>175</sup> Christopher Beaver, “Autism-Friendly Environments,” *The Autism File*, January 2, 2010. [http://www.autism-architects.com/storage/02.Jan2010TheAutismFileAutismFriendly Environments.pdf](http://www.autism-architects.com/storage/02.Jan2010TheAutismFileAutismFriendly%20Environments.pdf) (accessed November 9, 2010).

<sup>176</sup> Lindsay Barba, “A One-Stop Shop for Autism Services,” *Behavioral Healthcare* 30(6) (2010 June): 28-31. <http://www.behavioral.net/ME2/dirmod.asp?type=Publishing&mod=Publications::Article&mid=64D490AC6A7D4FE1AEB453627F1A4A32&tier=4&id=AC89DB53BB4F4E46875A6E711B660223> (accessed November 8, 2010).

<sup>177</sup> Myler, et al.

<sup>178</sup> Humphreys: 6-7.

<sup>179</sup> Beaver, “Designing for Autism”: 76-78.

aide may be required to provide direct assistance in an area not normally designed for two people.<sup>180</sup>

### ***Lighting***

Lighting is mentioned in most of the literature that deals with designing for autism, as sensitivity to fluorescent lighting is a common characteristic among these individuals. Fluorescent lighting has a “flicker” that is almost non-discernable to most people, but that can be very distracting to people with autism. This can often lead to seizures if they fix their gaze on the light.<sup>181</sup>

Full spectrum lighting is preferred, but non-fluorescent lighting uses much more energy than fluorescent lighting. One solution is to provide only indirect fluorescent lighting, so that the lamps are not visible.<sup>182</sup> Diffused lighting is also a good strategy. Dimming capabilities provides the flexibility to adjust the light to suit the task, and can be used to change the mood of a space.<sup>183</sup>

Care must be taken when employing natural light, and there are differing opinions on the use of natural light in autism facilities. The proponents indicate that high levels of natural light can be uplifting, and can help to assist in the visual understanding of a space, thus reducing anxiety.<sup>184</sup> However, windows provide views that can be potentially distracting to students with autism. This might suggest the possibility of high windows that admit natural light but do not provide a view to the

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<sup>180</sup> Khare and Mullick: 50.

<sup>181</sup> Myler, et al.

<sup>182</sup> Ibid.

<sup>183</sup> Barba.

<sup>184</sup> Humphreys: 6.

outside. But even this can be problematic, as high windows, clerestory windows, and even skylights can create shifting patterns of daylight in the room that can be equally distracting. Therefore, placement of windows must be carefully evaluated.<sup>185</sup> Windows with views may be more appropriate in certain areas of the facility, such as administrative space, but less desirable in classrooms, where full focus and concentration is required.

### ***Acoustics***

Sensitivity to noise is also a common trait among individuals with autism; therefore acoustics is another area mentioned in virtually all of the literature pertaining to designing for autism. Material selection, mechanical system design, and a floor plan that segregates high activity areas from quieter spaces are the key aspects to consider.

Sound-absorbing materials should be considered where appropriate. This can include carpet and acoustical tile ceilings. In addition, sound-insulation in the walls and above the ceiling would be appropriate for most rooms, but especially for rooms such as one-to-one classrooms and speech therapy rooms.<sup>186</sup>

A heating, ventilation, and air conditioning (HVAC) system that maintains a continuous air-flow should be used to avoid the distraction of on/off cycles.<sup>187</sup>

Careful planning can ensure that high activity spaces (such as playrooms, gymnasiums, and music rooms), as well as other noisy areas (such as mechanical rooms)

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<sup>185</sup> Myler, et al.

<sup>186</sup> Barba.

<sup>187</sup> Ibid.

are segregated from the quiet areas such as classrooms. Appropriate acoustical treatments should be employed when these spaces are adjacent to one another.<sup>188</sup> Depending upon the site, it may also be important to consider external sources of noise.<sup>189</sup>

### ***Durability***

Durability is important in any educational setting, and is even more important in a facility for autism. These students can be extremely demanding on the building. The trick is to specify durable materials without giving an institutional feel. High-impact drywall and tempered glass should be utilized.<sup>190</sup> In addition to building materials, durability and ease of maintenance should be inherent qualities of the furniture and equipment as well.<sup>191</sup>

### ***Observability***

Observability should address both overall observation in the facility, as well as the inclusion of observation rooms. It is good practice to be able to observe the students at all times, but without them feeling like they are constantly under surveillance. Again, this benefits both the student and the instructors.<sup>192</sup> Observation rooms are necessary to monitor the student's progress, and also for senior staff to monitor the implementation of the student's programs. In addition, parents use

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<sup>188</sup> Ibid.

<sup>189</sup> Myler, et al.

<sup>190</sup> Barba.

<sup>191</sup> Khare and Mullick: 50.

<sup>192</sup> Humphreys: 7.

observation rooms so they can duplicate techniques and methods at home and in the community.<sup>193</sup>

### ***Simple Wayfinding/Visual Cues***

Students with autism need a simple and easily understood system for moving about a facility and getting from point A to point B. A simple and straightforward floor plan will accommodate this. Long corridors, excessive changes in direction, and changes in level should be avoided. It is also possible to take advantage of the strong visual skills of most autistic individuals by providing visual cues and landmarks that assist in navigation. Signage can incorporate not only words, but colors and symbols as well.<sup>194</sup>

### ***Indoor Air Quality***

Due to the incidence of allergies and upper-respiratory problems in people with autism, they can be highly sensitive to environmental conditions, especially airborne contaminants such as dust, mold, and pollen. Therefore, indoor air quality is a primary concern, and the facility's HVAC system should meet a higher standard than a typical school or office building (possibly even hospital standards), such as increased filtration and additional air changes.<sup>195</sup> Natural ventilation should be used to the extent possible, as it is generally healthier than artificial means.<sup>196</sup>

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<sup>193</sup> Myler, et al.

<sup>194</sup> Beaver, "Designing for Autism," 77.

<sup>195</sup> Myler, et al.

<sup>196</sup> Humphreys: 6.

### ***Adequate Storage***

Adequate storage is an absolute necessity in a facility for autism. Many of the drills and exercises that make up behavioral therapy, particularly during early intervention, require materials and objects that must be stored when not in use.<sup>197</sup> Physical and occupational therapy also need storage for the equipment used during their sessions. Storage should be a combination of both open and closed; open storage is often used for items that serve as reinforcers for the students. This open storage is typically shelving that is mounted high out of the children's reach, but within their sight, so that they must ask for the object they want. Mobile storage units on wheels offer convenience for items that need to be brought into a one-to-one classroom for a particular session. Providing adequate storage reduces clutter, thereby eliminating visual distractions.<sup>198</sup>

### ***Sensory Rooms/Quiet Rooms***

All children have tantrums, but kids with autism can have extreme meltdowns that are dangerous and last for extended periods of time. These can often be caused by overstimulation, or simply by needing a break and not being able to communicate that need. It is important for therapists to learn the early warning signs for each individual child, and to take appropriate steps to try to alleviate the stressors before the tantrum escalates. Sensory rooms and quiet rooms can assist in this regard. These can also be

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<sup>197</sup> Myler, et al.

<sup>198</sup> Ibid.

referred to as “escape spaces.”<sup>199</sup> Sensory rooms are utilized when the child needs sensory input, which can be provided in a variety of ways, such as with bean bag chairs, or different textures on the walls. Quiet rooms simply offer a place for the child to calm down when they become overwhelmed with a particular task. Sensory rooms and quiet rooms should be conveniently located near classrooms.<sup>200</sup>

### ***Technology***

Facilities for autism should be designed to accommodate the latest in information technologies. Computers and other electronic devices, including augmentative communication devices, often play an important role in therapy.<sup>201</sup> Many students with autism respond better to lessons that are delivered in a multi-media format, and these options should be available in the classroom. It is a general trend in education to tailor the curriculum to each individual student, and this is imperative for students with autism. Technology in the classroom can assist in this regard, helping instructors to modify lessons to best fit each individual’s learning style.

### ***Bathrooms Near Classrooms***

Having bathrooms near the classrooms is obviously a convenience for both the students as well as the staff that may need to accompany them there. Some children may be incontinent, in which case you want to minimize the distance they must travel to

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<sup>199</sup> Magda Mostafa, “An Architecture for Autism: Concepts of Design Intervention for the Autistic User,” in *ArchNet-IJAR: International Journal of Architectural Research*, vol. 2, issue 1 (2008). [http://archnet.org/library/documents/one-document.jsp?document\\_id=10331](http://archnet.org/library/documents/one-document.jsp?document_id=10331) (accessed November 9, 2010).

<sup>200</sup> Beaver, “Designing for Autism,” 77-78.

<sup>201</sup> Myler, et al.

an area where they can clean up. This also indicates the need for a shower. A dedicated toilet and shower for each classroom would be ideal, but not usually practical. A better solution might be to locate bathroom and shower facilities in between two classrooms, to be shared by both.<sup>202</sup>

### ***Separate Rooms for Art, Music, PT and OT***

Depending upon the needs of the individual, physical and occupational therapy can play an important role in a treatment program. Virtually all children on the autism spectrum require occupational therapy to address their sensory issues. Likewise, art and music can be vital in the education of autistic children, and many of these kids demonstrate great talent in the visual arts. It is therefore important to provide dedicated rooms for these functions. Due to their unique requirements, equipment, etc., it is not really appropriate to pursue these activities in multi-function rooms. In addition, OT and PT spaces may require additional structural reinforcement because of specialized, ceiling-hung equipment, such as swings.<sup>203</sup>

### ***Conclusions***

It should be noted that the “designing for autism” resources referenced in this chapter are directed exclusively at the educational environment. However, these characteristics could be carried over into the other spaces of an autism treatment, resource, and support center – the clinical and support spaces. For example, the exam

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<sup>202</sup> Beaver, “Designing for Autism,”: 77.

<sup>203</sup> Myler, et al.



REFERENCE	DESIGN CHARACTERISTIC																				
	Flexibility	Clarity & Order	Non-Threatening Environment	Non-Distracting/Low Stimulation	Predictability	Proportion	Safety	Security	Non-Institutional	Warm, Soft Colors	Proxemics (Need for More Space)	Lighting	Acoustics	Durability	Observability	Simple Wayfinding/Visual Cues	Indoor Air Quality	Adequate Storage	Sensory Rooms/ Quiet Rooms	Technology	Bathrooms Near Classrooms
Barba, "A One-Stop Shop for Autism Services"		X		X						X		X	X	X		X					
Beaver, "Autism-Friendly Environments"										X		X	X				X		X		X
Beaver, "Designing for Autism"	X	X		X							X	X	X			X	X		X		X
Coventry University, "Classroom Design Improves Education for Children with Autism"										X		X	X							X	
Hill Studio, "Designing for Autism"							X	X				X	X								
Humphreys, "Autism and Architecture"		X				X	X	X			X	X	X	X	X		X				
Khare & Mullick, "Incorporating the Behavioral Dimension in Designing Inclusive Learning Environments for Autism"	X	X		X			X				X			X	X	X			X		
McGuire, "Designing for Autism"										X		X	X	X					X	X	
Mostafa, "An Architecture for Autism: Concepts of Design Intervention for the Autistic User"		X		X	X					X		X	X			X	X		X		
Myler, et al, "Eliminating Distractions"			X	X	X	X	X		X	X		X	X		X		X	X		X	X
Vogel, "Classroom Design for Living and Learning with Autism"	X		X	X	X		X	X	X			X						X	X		
Total Number of References	3	5	2	6	3	2	5	3	2	6	3	10	9	4	3	4	5	2	6	3	2

Table 5.1: Autism Design Characteristic References

rooms in the clinical area should be non-distracting, rather than the type of exam room you would find in a typical pediatric clinic, with cartoon scenery covering the walls. Or in the support area, with the possible inclusion of a grocery store that sells items for the special diets many autistic children are on – indirect lighting should be used, rather than the typical fluorescent lighting you would find in your neighborhood grocery store.

Many of the design characteristics discussed in this chapter would be good design practice for any school, such as durability and indoor air quality. And quite frankly, the incorporation of most of these attributes would in no way detract from the environment of a mainstream school. Therefore, incorporation of these items into the design of all schools would result in a more inclusive environment that would foster the learning of all students, both neurotypical and those with special needs.

For a facility designed exclusively for autism, however, the overall goal is to provide a calm, soothing environment, that meets the educational, physical, and sensory needs of the students. Because every autistic individual is unique, there is no perfect solution, but by following the guidelines outlined in this chapter, an environment can be created that will foster the development of this very special population.

## **CHAPTER 6: QUALITATIVE RESEARCH RESULTS**

The qualitative research conducted as part of this study consisted of two primary elements. The first of these was an autism facilities survey that was distributed to parents, practitioners, and others associated with the autism community. This survey was essentially aimed at garnering their input as to the relative importance of various rooms or spaces in a comprehensive autism treatment, resource, and support center. The second element consisted of site visits to three prominent autism treatment centers on the island of Oahu, and interviews with a staff member at each facility.

Both methods provided valuable feedback for the development of the planning and programming criteria document. This chapter reviews the results of these efforts.

### ***Autism Facilities Survey***

The “Participant Consent Form,” as well as the “Autism Facilities Survey/Interview” itself have been reproduced on the following pages. These forms were e-mailed to approximately 150 individuals on autism-related mailing lists on the island of Oahu. The survey was also posted on SurveyMonkey.com, and the e-mail provided a link to the survey. Therefore, the participants had the option of completing the survey online, or by returning the form. The majority of the responses were received online. There were a total of 43 respondents, which represents a 28.6% rate of return. 40 of the 43 responses were completed online (93%). All respondents that started the survey online completed it (40 of 40). Of the remaining three, one was e-mailed back, one was faxed, and one was handed to me during an interview.

## **Participant Consent Form**

Agreement to Participate in

Autism Facilities Survey

Michael D. Eller  
Primary Investigator  
(808) 258-9783

This research project is being conducted as a component of a dissertation for a doctoral degree. The purpose of the project is to learn what type of functions would be beneficial and appropriate in a comprehensive autism treatment facility. You are being asked to participate because of your affiliation with the autism community.

Participation in the project consists of filling out a short survey questionnaire, and a short interview with the investigator. Interview questions will focus on the answers provided in the questionnaire in order to gain a full understanding of all responses. Data from the surveys and interviews will be summarized into broad categories. No personal identifying information will be included with the research results. Completion of the form should take no more than 10-15 minutes. Each interview should last no longer than 20 minutes. Approximately 30 people will participate in the study.

The investigator believes there is no risk to participating in this research project.

Participating in this research may be of no direct benefit to you. It is believed, however, the results from this project will help determine the most appropriate functions to include in an autism treatment, resource, and support center.

Research data will be confidential to the extent allowed by law. Agencies with research oversight, such as the UH Committee on Human Studies, have the authority to review research data. All research records will be stored in a locked file in the primary investigators' office for the duration of the research project. All research records will be destroyed upon completion of the project.

Participation in this research project is completely voluntary. You are free to withdraw from participation at any time during the duration of the project.

If you have any questions regarding this research project, please contact the researcher, Michael Eller, at (808) 258-9783.

If you have any questions regarding your rights as a research participant, please contact the UH Committee on Human Studies at (808) 956-5007, or [uhirb@hawaii.edu](mailto:uhirb@hawaii.edu)

## AUTISM FACILITIES SURVEY/INTERVIEW

The purpose of this survey is determine the relative importance of various functions (rooms, spaces) in facilities that provide autism treatment services (educational, clinical, and support services). The results of this survey will help determine the most appropriate spaces to be included in a programming document/design template for comprehensive facilities that provide a holistic approach to the treatment of individuals with autism, and their families, during early intervention.

**INSTRUCTIONS:** Circle the letter that corresponds to the most appropriate answer.

1. Please indicate your association with the autism community:

- a. Parent of a child on the autism spectrum
- b. Special Education Teacher
- c. Behavioral Specialist
- d. Skills Trainer
- e. Medical Professional
- f. Speech Therapist
- g. Occupational Therapist
- h. Other \_\_\_\_\_

For parents, please answer questions 2-3. For all others, please skip to question 4.

2. To what degree (if any) have you been inconvenienced in providing services for your child due to the varied location of these services (scheduling, transportation, etc.)?

- a. Not at all
- b. A little
- c. Somewhat
- d. Very much so

3. How far would you be willing to travel to access a comprehensive autism treatment, resource, and support facility?

- a. Less than 5 miles
- b. 5-10 miles
- c. 10-20 miles
- d. More than 20 miles

4. Do you feel it would be beneficial if services for autism were co-located in the same facility?

- a. Yes
- b. No

For question #5, imagine a comprehensive autism treatment, resource, and support facility is to be built within convenient access of your location. Consider what types of services you feel should be offered in such a facility. Please consider the perspectives of the patients, the families, and the various caregivers when determining what services should be provided.

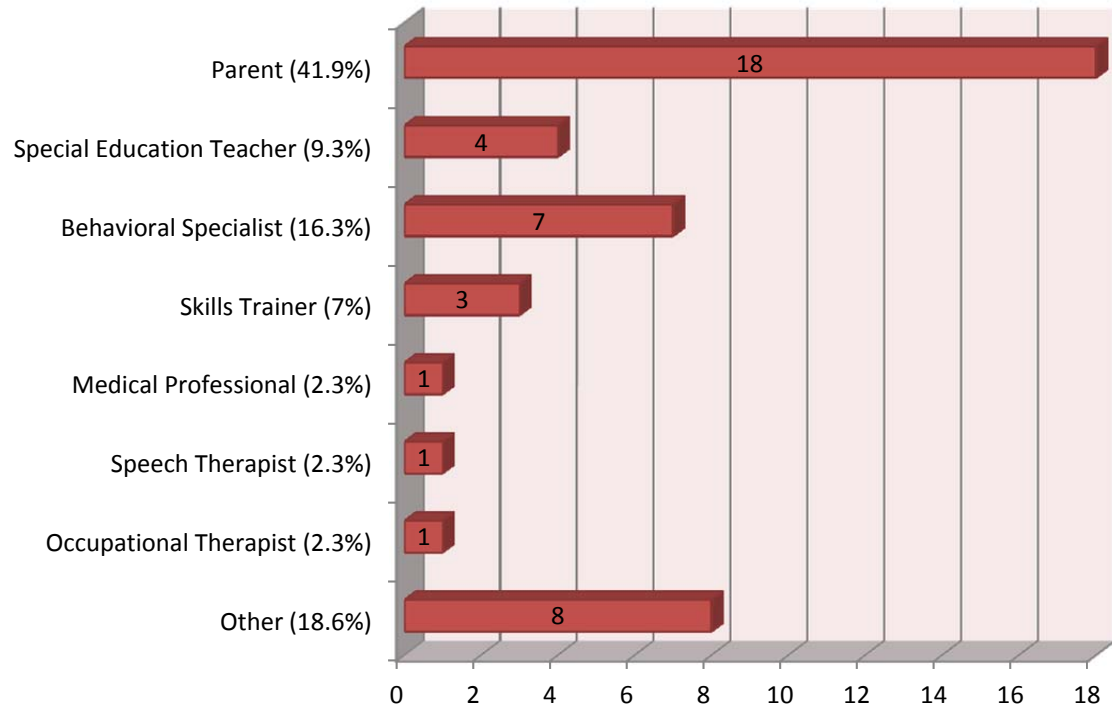
5. For the table below, circle the number to the right that best fits your opinion on the importance of the room/space. Use the scale above to match your opinion.

Type of Room/Space	Scale of Importance				
	Not at all	Not very	No Opinion	Some-what	Extremely
<b>Educational Spaces</b>					
Group Classrooms	1	2	3	4	5
Individual (one-on-one) Classrooms	1	2	3	4	5
Observation Rooms	1	2	3	4	5
Quiet Rooms	1	2	3	4	5
Play Rooms	1	2	3	4	5
Sensory Rooms	1	2	3	4	5
Music Room	1	2	3	4	5
Art Room	1	2	3	4	5
Computer Lab	1	2	3	4	5
Gymnasium	1	2	3	4	5
<b>Clinical Spaces</b>					
Doctors' Offices	1	2	3	4	5
Nurses' Offices	1	2	3	4	5
Exam Rooms	1	2	3	4	5
Treatment Rooms	1	2	3	4	5
Clinical Laboratory	1	2	3	4	5
Compounding Pharmacy	1	2	3	4	5
Functional MRI (fMRI) Room	1	2	3	4	5
SPECT Scan Room	1	2	3	4	5
Physical Therapy Space	1	2	3	4	5
Occupational Therapy Space	1	2	3	4	5
Speech Therapy Rooms	1	2	3	4	5
Hyperbaric Oxygen Therapy (HBOT) Room	1	2	3	4	5
Dietician's Office	1	2	3	4	5
Dental Treatment Room	1	2	3	4	5

Support Spaces					
Lobby/Waiting Area	1	2	3	4	5
Library/Bookstore	1	2	3	4	5
Cafeteria	1	2	3	4	5
Specialized Grocery Store	1	2	3	4	5
Parent/Family Lounge	1	2	3	4	5
Conference/Training Rooms	1	2	3	4	5
Barber Shop	1	2	3	4	5
Family/Marriage Counseling Rooms	1	2	3	4	5
Legal Aid Office	1	2	3	4	5
Chapel	1	2	3	4	5
Relaxation Room (Adult)	1	2	3	4	5
Relaxation Room (Child)	1	2	3	4	5
Exterior Play Area	1	2	3	4	5
<p><b>Are there any additional functions not listed above that you feel would be appropriate in an autism treatment facility?</b></p>					
<p><b>Any additional comments you would like to make?</b></p>					
<p><b>Thank you for your participation in this study.</b></p>					

**Results and Analysis.** The results of the survey are presented and analyzed below on a question-by-question basis.

Question 1: Please indicate your association with the autism community:



*Figure 6.1: Profile of Respondents*

The “Other” category included the following responses:

- Clinical Social Worker
- Clinical Director
- DOE Staff
- Supervisor of Psychological Services
- Music Therapist
- Academic Diagnostician
- Clinical Psychologist
- Other (unspecified)



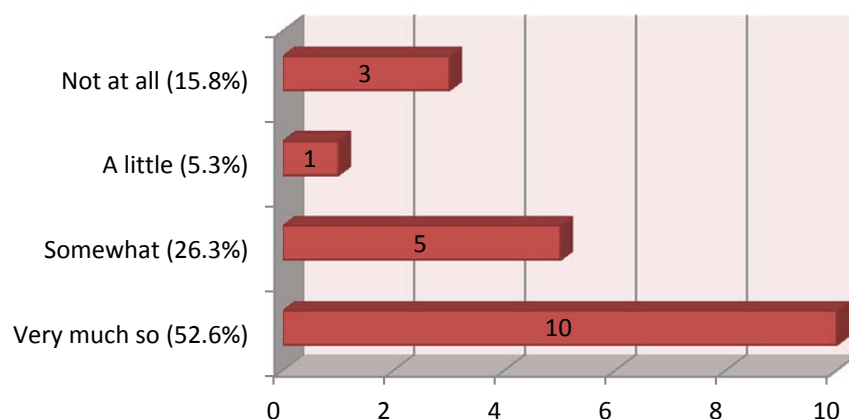
Three parents of children on the autism spectrum had double entries. For the purposes of data analysis, the responses of these three individuals are included with the “Parents” group.

- Parent AND Skills Trainer (2)
- Parent AND Special Education Teacher (1)

Analysis. Clearly, more parents of children on the autism spectrum were able to complete the survey than any other single category. This was expected, as they represent the largest group associated with the mailing lists used. However, the ratio of parents to all other categories (which are primarily educators and clinicians) of 41.9% to 58.1% of total respondents represents a fairly equitable mix of participants.

(Questions 2 and 3 were for parents. Others were requested to skip to question 4.)

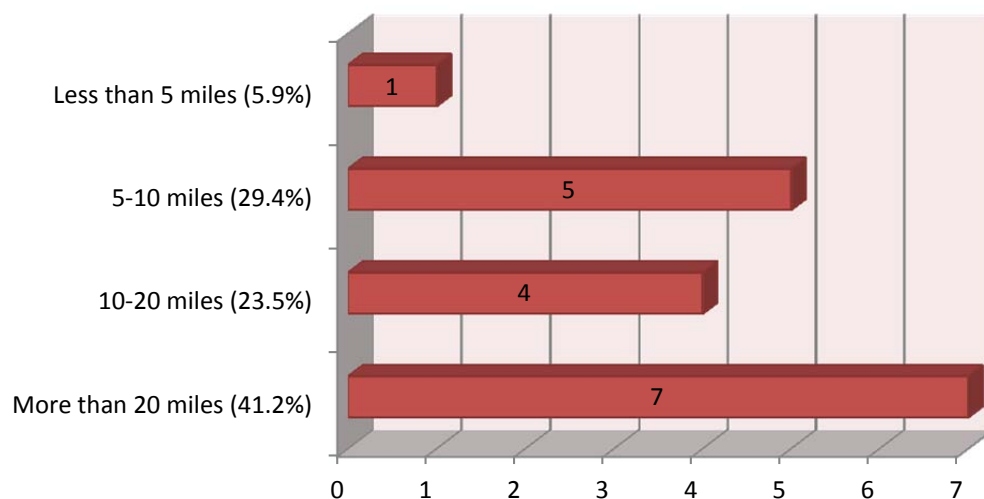
Question 2: To what degree (if any) have you been inconvenienced in providing services for your child due to the varied location of these services (scheduling, transportation, etc.)?



*Figure 6.2: Degree of Inconvenience*

Analysis. With 19 responses to this question and only 18 parent participants in the survey, obviously one respondent was not a parent. That fact notwithstanding, it is clear that parents are being greatly inconvenienced by the scattered locations of autism services, with 15 of 19 respondents (79%) being either “somewhat” or “very much so” affected. This would tend to support the co-location of services in a comprehensive autism treatment, resource, and support center.

Question 3: How far would you be willing to travel to access a comprehensive autism treatment, resource, and support facility?

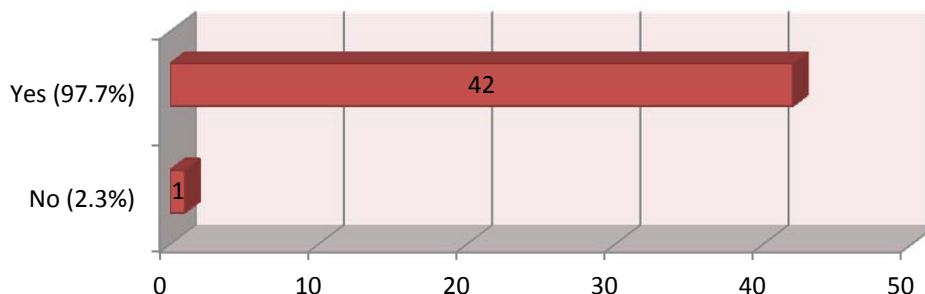


*Figure 6.3: Distance Willing to Travel*

Analysis. (With 17 responses, one parent obviously skipped this question.) All but one of the respondents indicated a willingness to drive more than 5 miles to access services for their child, with 41.2% willing to travel more than 20 miles. This should not be surprising, since it concerns the health and welfare of their children. However, the

distribution of the responses also indicates that convenience is important as well, and some people do put a limit on how far they are willing to travel.

Question 4: Do you feel it would be beneficial if services for autism were co-located in the same facility?



*Figure 6.4: Co-located Autism Services Beneficial?*

Analysis. The nearly unanimous response to this question lends credence to the proposal for, and creation of, comprehensive autism, treatment, resource and support centers. The single “no” answer came from a behavioral specialist.

Question 5: For question #5, imagine a comprehensive autism treatment, resource, and support facility is to be built within convenient access of your location. Consider what types of services you feel should be offered in such a facility. Please consider the perspectives of the patients, the families, and the various caregivers when determining what services should be provided.

For the table below, circle the number to the right that best fits your opinion on the importance of the room/space. Use the scale above to match your opinion.

Type of Room/Space	Scale of Importance				
	Not at all	Not very	No Opinion	Some-what	Extremely
<b>Educational Spaces</b>					
Group Classrooms	0 (0.0%)	1 (2.3%)	1 (2.3%)	11 (25.6%)	<b>30 (69.8%)</b>
Individual (one-on-one) Classrooms	0 (0.0%)	3 (7%)	2 (4.7%)	13 (30.2%)	<b>25 (58.1%)</b>
Observation Rooms	0 (0.0%)	2 (4.8%)	3 (7.1%)	<b>19 (45.2%)</b>	18 (42.9%)
Quiet Rooms	0 (0.0%)	2 (4.7%)	3 (7%)	14 (32.6%)	<b>24 (55.8%)</b>
Play Rooms	0 (0.0%)	0 (0.0%)	0 (0.0%)	14 (32.6%)	<b>29 (67.4%)</b>
Sensory Rooms	0 (0.0%)	0 (0.0%)	3 (7%)	10 (23.3%)	<b>30 (69.8%)</b>
Music Room	0 (0.0%)	1 (2.3%)	5 (11.6%)	18 (41.9%)	<b>19 (44.2%)</b>
Art Room	0 (0.0%)	2 (4.7%)	5 (11.6%)	<b>19 (44.2%)</b>	18 (41.9%)
Computer Lab	1 (2.3%)	2 (4.7%)	4 (9.3%)	15 (34.9%)	<b>21 (48.8%)</b>
Gymnasium	0 (0.0%)	5 (11.6%)	7 (16.3%)	<b>16 (37.2%)</b>	15 (34.9%)
<b>Clinical Spaces</b>					
Doctors' Offices	0 (0.0%)	6 (14%)	6 (14%)	12 (27.9%)	<b>19 (44.2%)</b>
Nurses' Offices	1 (2.3%)	5 (11.6%)	12 (27.9%)	<b>13 (30.2%)</b>	12 (27.9%)
Exam Rooms	2 (4.7%)	4 (9.3%)	8 (18.6%)	13 (30.2%)	<b>16 (37.2%)</b>
Treatment Rooms	1 (2.3%)	4 (9.3%)	9 (21%)	11 (25.6%)	<b>18 (41.9%)</b>
Clinical Laboratory	4 (9.3%)	5 (11.6%)	<b>13 (30.2%)</b>	11 (25.6%)	10 (23.3%)
Compounding Pharmacy	5 (11.6%)	9 (21%)	<b>18 (41.9%)</b>	3 (7%)	8 (18.6%)
Functional MRI (fMRI) Room	7 (16.3%)	7 (16.3%)	<b>20 (46.5%)</b>	3 (7%)	6 (14%)
SPECT Scan Room	5 (11.6%)	8 (18.6%)	<b>19 (44.2%)</b>	4 (9.3%)	6 (14%)
Physical Therapy Space	0 (0.0%)	3 (7%)	1 (2.3%)	15 (34.9%)	<b>24 (55.8%)</b>
Occupational Therapy Space	0 (0.0%)	2 (4.8%)	1 (2.4%)	11 (26.2%)	<b>28 (66.7%)</b>
Speech Therapy Rooms	0 (0.0%)	1 (2.3%)	2 (4.7%)	11 (25.6%)	<b>29 (67.4%)</b>
Hyperbaric Oxygen Therapy (HBOT) Room	5 (11.6%)	6 (14%)	<b>20 (46.5%)</b>	8 (18.6%)	4 (9.3%)
Dietician's Office	2 (4.7%)	3 (7%)	10 (23.3%)	<b>14 (32.6%)</b>	12 (27.9%)
Dental Treatment Room	6 (14.3%)	6 (14.3%)	<b>12 (28.6%)</b>	10 (23.8%)	8 (19%)
<b>Support Spaces</b>					
Lobby/Waiting Area	1 (2.3%)	2 (4.7%)	5 (11.6%)	<b>19 (44.2%)</b>	16 (37.2%)
Library/Bookstore	0 (0.0%)	5 (11.9%)	7 (16.7%)	<b>16 (38.1%)</b>	13 (31%)
Cafeteria	0 (0.0%)	2 (4.7%)	9 (21%)	<b>17 (39.5%)</b>	14 (32.6%)
Specialized Grocery Store	5 (11.6%)	5 (11.6%)	<b>13 (30.2%)</b>	10 (23.3%)	10 (23.3%)
Parent/Family Lounge	3 (7%)	4 (9.3%)	9 (21%)	<b>16 (37.2%)</b>	11 (25.6%)
Conference/Training Rooms	1 (2.3%)	0 (0.0%)	4 (9.3%)	13 (30.2%)	<b>25 (58.1%)</b>
Barber Shop	8 (18.6%)	<b>12 (27.9%)</b>	11 (25.6%)	7 (16.3%)	5 (11.6%)
Family/Marriage Counseling Rooms	3 (7%)	3 (7%)	13 (30.2%)	<b>14 (32.6%)</b>	10 (23.3%)
Legal Aid Office	3 (7%)	1 (2.3%)	12 (27.9%)	<b>14 (32.6%)</b>	13 (30.2%)
Chapel	8 (18.6%)	4 (9.3%)	<b>20 (46.5%)</b>	7 (16.3%)	4 (9.3%)
Relaxation Room (Adult)	4 (9.3%)	3 (7%)	9 (21%)	<b>19 (44.2%)</b>	8 (18.6%)
Relaxation Room (Child)	2 (4.7%)	1 (2.3%)	6 (14%)	<b>19 (44.2%)</b>	15 (34.9%)
Exterior Play Area	0 (0.0%)	0 (0.0%)	1 (2.3%)	11 (25.6%)	<b>31 (72.1%)</b>

NOTE: Observation Rooms, Occupational Therapy Space, Dental Treatment Room, and Library/Bookstore each had only 42 responses. This was likely due to simple oversight on the part of the respondents, based on the length and format of the survey.

*Table 6.1: Summary of Question 5 Responses*

Analysis. The results to question 5 (Table 6.1) can be analyzed in several ways.

First, the rooms and spaces are grouped based on their highest number of responses:

	Educational Spaces	Clinical Spaces	Support Spaces
<b>Extremely important</b>	Group Classrooms Individual (one-on-one) Classrooms Quiet Rooms Play Rooms Sensory Rooms Music Room Computer Lab	Doctor's Offices Exam Rooms Treatment Rooms Physical Therapy Space Occupational Therapy Space Speech Therapy Rooms	Conference/Training Rooms Exterior Play Area
<b>Somewhat important</b>	Observation Rooms Art Room Gymnasium	Nurses' Offices Dietician's Office	Lobby/Waiting Area Library/Bookstore Cafeteria Parent/Family Lounge Family/Marriage Counseling Rooms Legal Aid Office Relaxation Room (Adult) Relaxation Room (Child)
<b>No opinion</b>		Clinical Laboratory Compounding Pharmacy Functional MRI (fMRI) Room SPECT Scan Room Hyperbaric Oxygen Therapy (HBOT) Room Dental Treatment Room	Specialized Grocery Store Chapel
<b>Not very important</b>			Barber Shop
<b>Not at all important</b>			

*Table 6.2: Rooms/Spaces Sorted by Most Common Response*

Sorting the data in this fashion highlights some interesting results. The educational spaces as a group are clearly deemed the most important. And the direct, traditional care clinical spaces are important as well (doctors, therapists, etc.). Support spaces, although less important than educational and clinical spaces, are still considered “somewhat important,” generally speaking.

The group of clinical spaces listed under “No Opinion” is an interesting category. It could be that the heading “No Opinion” was interpreted in two ways: one as truly not having an opinion about the space; or the second being as simply the middle rating on the scale of 1 to 5. This could be considered a flaw in the survey. It is also possible, when considering the types of spaces listed, that many participants simply didn’t know what some of these functions are, and therefore selected “No Opinion.” Finally, many may consider that the availability of ancillary services (lab, x-ray, pharmacy) at local facilities does not necessitate the need for dedicated services in an autism center.

The other significant finding is how heavily weighted the chart is towards the top. No spaces fell under the category of “Not at all important,” while only one space fell under the category of “Not very important.” This would seem to indicate the validity of virtually all the rooms and spaces listed, and points to the need to at least consider them when planning comprehensive autism treatment, resource, and support centers.

Next, the data are sorted into the respondent groups “Parents” and “All Others.” This allows us to compare the responses of the parents with the educators and clinicians, to see if there are any significant differences amongst these two groups.

Type of Room/Space	Parents' Most Common Response	All Other's Most Common Response
<b>Educational Spaces</b>		
Group Classrooms	Extremely Important	Extremely Important
Individual (one-on-one) Classrooms	Extremely Important	Extremely Important
Observation Rooms	Somewhat/Extremely Important	Somewhat Important
Quiet Rooms	Somewhat/Extremely Important	Extremely Important
Play Rooms	Extremely Important	Extremely Important
Sensory Rooms	Extremely Important	Extremely Important
Music Room	Extremely Important	Somewhat Important
Art Room	Extremely Important	Somewhat Important
Computer Lab	Extremely Important	Extremely Important
Gymnasium	Extremely Important	Somewhat Important
<b>Clinical Spaces</b>		
Doctors' Offices	Extremely Important	Somewhat Important
Nurses' Offices	Extremely Important	No Opinion/Somewhat Important
Exam Rooms	Extremely Important	Extremely Important
Treatment Rooms	Extremely Important	Extremely Important
Clinical Laboratory	Extremely Important	No Opinion/Somewhat Important
Compounding Pharmacy	No Opinion	No Opinion
Functional MRI (fMRI) Room	No Opinion	No Opinion
SPECT Scan Room	No Opinion	No Opinion
Physical Therapy Space	Extremely Important	Extremely Important
Occupational Therapy Space	Extremely Important	Extremely Important
Speech Therapy Rooms	Extremely Important	Extremely Important
Hyperbaric Oxygen Therapy (HBOT) Room	No Opinion/Somewhat Important	No Opinion
Dietician's Office	Extremely Important	Somewhat Important
Dental Treatment Room	Extremely Important	No Opinion/Somewhat Important
<b>Support Spaces</b>		
Lobby/Waiting Area	Extremely Important	Somewhat Important
Library/Bookstore	Extremely Important	Somewhat Important
Cafeteria	Extremely Important	Somewhat Important
Specialized Grocery Store	No Opinion/Extremely Important	No Opinion/Somewhat Important
Parent/Family Lounge	Extremely Important	Somewhat Important
Conference/Training Rooms	Extremely Important	Extremely Important
Barber Shop	Not Very Important	No Opinion
Family/Marriage Counseling Rooms	No Opinion/Extremely Important	Somewhat Important
Legal Aid Office	Extremely Important	No Opinion
Chapel	No Opinion	No Opinion
Relaxation Room (Adult)	Extremely Important	Somewhat Important
Relaxation Room (Child)	Extremely Important	Somewhat Important
Exterior Play Area	Extremely Important	Extremely Important

*Table 6.3: Most Common Response of Parents and "All Others"*

Table 6.3 offers some interesting insights as well. In general, the results were fairly consistent between the two groups. The only space that reflected a difference of opinion of more than one position on the rating scale was the Legal Aid Office, which the parents felt was “Extremely Important,” while the other group had “No Opinion.” This is not surprising, as the parents are the ones that must familiarize themselves with their children’s legal rights regarding special education. In addition, when due process hearings are filed, it is the parents who seek out legal counsel to initiate the process.

It appears that the parents feel more strongly about a broader range of services, which is reflected in the number of “Extremely Important” responses. Again, both groups felt that the educational spaces were the most important category, and the “All Others” group specifically placed more emphasis on the types of rooms you would find in a typical autism facility (classrooms, sensory rooms, etc.). Both groups felt that physical, occupational, and speech therapy rooms were extremely important. It is evident that the educators and clinicians gave higher ratings to what they are familiar with (ABA and related program services), while the parents felt that services beyond what could be called “traditional” are equally important.

One space that had somewhat surprising results was the barber shop, which was “Not Very Important” to the parents, while the “All Others” group had “No Opinion.” Since it is the parents who must deal with getting their child to sit through a haircut, it would be logical to assume they would place more importance on this function. Evidently not.



Finally, the rooms and spaces are listed in order of their average score. This will give us an idea of the overall priority in the minds of the respondents:

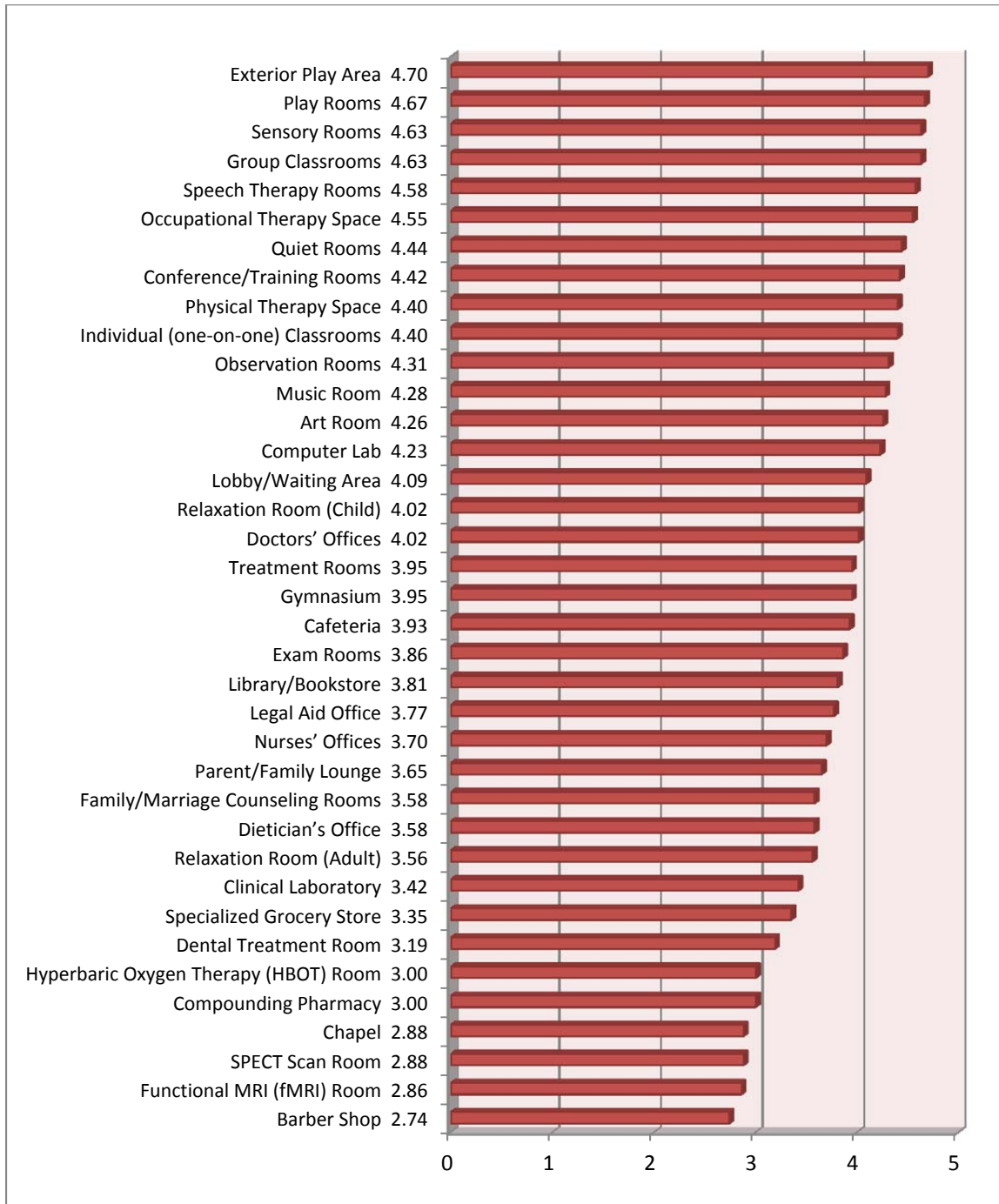


Figure 6.5: Rooms/Spaces Sorted by Average Score

Ranking the rooms and spaces by their average score gives a clear indication of what respondents feel is most important. It is interesting to note that “Exterior Play Area” and “Play Room” had the highest scores, showing the importance many respondents placed on the ability to engage in play, both for educational and sensory purposes. Again we see that, generally speaking, the educational spaces have the higher scores, followed by the clinical spaces and support spaces, while the ancillary services are towards the bottom of the rankings.

The most fascinating aspect of the average scores, however, may be that the lowest rated space (barber shop) still had an average score of 2.74! Although the inclusion of a barber shop may have been lost on some respondents, there were clearly several people who know exactly what it is like to try and take a child with autism for a haircut. Even in a shop that caters to children, the antics of a child with autism can be very disturbing, and not all parents are understanding. This holds true for the dental treatment room as well, and was the reason these spaces were included in the survey.

Question 6: Are there any additional functions not listed above that you feel would be appropriate in an autism treatment facility?

14 people responded to this question with a wide range of suggestions:

“A specifically designed exercise program, using the latest brain research involving exercise and the brain, to improve and support brain function.” --Academic diagnostician

“ Water play area or small pool, pet area, screening room.” --Behavioral specialist

"For clarification, my answer for "gymnasium" leans more toward a designated area where the patients can participate in exercise activities whether in/outdoors; a "cafeteria" could be more in the area of a kitchen facility where patients can prepare meals independently or with help as needed." --Parent

"None that I can think of." --Skills trainer

"I think families can access their own resources such as personal doctor's that practice what they believe (DAN vs. pediatrician) or a grocery store that provides foods that they can purchase." --Special education teacher

"Laundry room and hands-on kitchen for vocational training." --Parent

"Design the facility in such a way (like defensive space concept) that will increase the interactions among all staff/parties involved." DOE staff

"A social group area could work. This is what I'm working on with my two girls."  
--Parent

"I think it is important to differentiate how many individuals and what ages would be "treated" in a facility like this and how it would integrate with an "educational" system of care. One perspective is a comprehensive "holistic approach" from diagnosis at 18 months to adulthood including transition to work programs for adults such as Eden Services in New Jersey. This would include an early intervention program and later a school aged program. The facility should include typically developing peers for role modeling and integration & generalization of skills across settings. Natural environments, most like same aged peers are perhaps more useful for younger children (0-3 years) & older individuals who are high functioning and will need to function independently as adults in the neurotypical society. Most university/private programs are very limited in scope and the total number of children they can "treat" due to cost and high staffing requirements per individual. The program should be data driven and recipients of care should be able to see objectively that the treatment received is evidence based and supportive of families overall well-being, including financial well being." --Clinical social worker

"Social service/resource center or office? Teacher/behavioral therapists/psychologist's office would be part of the classrooms?" --Medical professional

"A DAILY LIVING SKILLS LEARNING CENTER, with kitchen and laundry facilities would be great to have. Such skills are included in most IEPs, and a Home Economics classroom, would be helpful." --Parent and special education teacher

“Professional staff. One that deals with all age range 0 - adulthood. A balance of service for all age. My son is 19 and now our service is slim and not.” --Parent and skills trainer

“I found I could not realistically comment on the alternative treatment facilities aspect. So far, I’ve worked in 2 facilities where the “family room” was underutilized. However, if you want to accommodate full family services, there *must* be one. Maybe outfitted as multipurpose. The same goes for the smaller treatment rooms. Except for sensory – which really needs space for their unique equipment.” --Clinical psychologist

- “- Flexibility/ease to adapt/change/create varying spaces – (shatterproof-soft walls)
  - Flexibility/ease to change furniture and easy to use door/drawer/store handles/locks, etc.
  - Flexibility/ease to change lighting conditions and textures (e.g. light filters!)
  - Flexibility/ease to change color and spatial arrangements (see above also)
  - Flexibility/ease to change textures (on walls/floors and table tops)
  - Non-skid table tops/flooring and variety of matting/carpeting/softness-hardness, etc.
  - Sand/grass/water/pool/steps/ramps/climbing areas
  - “Comfortable” “lightweight” seating (no sharp angles)
  - Good (covert and overt) video/camera panning in all areas
  - Ability to soundproof some rooms/good sound insulation throughout
  - Safe well planned canteen/eating areas and drive-in-parking roads w/“real” signs
  - Ability through the use of well planned storage areas to empty a room and fill it as needed
  - Well planned personal/client-student storage areas
  - Library and film archives (easily visible and located)
  - Easily visible and reachable storage areas for “reinforcers”
  - Lots consistent signage/labeling system, throughout (+writing/white boards in all rooms)”
- Special education teacher

A common suggestion (referred to in several different ways) was for some type of daily living skills unit. This type of space is particularly important for older individuals with autism, and would be important to include in a center that caters to these students. Although the intent of this project is primarily to address early intervention, it is certainly feasible to include this type of space in the criteria document, so that owners

and designers have the option to include this should the scope of their project warrant it.

Other pertinent suggestions listed above include a water play area, and an intake area (screening room).

Question 7: Any additional comments you would like to make?

There were 14 responses to this question as well:

"I think it is important to have a place like this, especially medical treatment because a lot of people even in the medical field don't know how to work with children with special needs and that can cause them to be insensitive or too rough or even scared and the children pick up on that negative energy and react to it. Having support of people who are familiar and experienced with working with children with special needs is extremely beneficial for everyone involved especially the client. The legal services are very beneficial for parents when they do not know their child's rights to services or how to get them. The counseling is so important to provide support to the family, offer methods and just let them know they are not alone, they are supported." --Skills trainer

"Sounds amazing so far. I would like more information if this becomes available.  
THANKS!"

--Behavioral specialist

"Although there is a good range for the answer that can be given for each answer, there are so many factors in an answer that you don't see in these simple questionnaires. Each family goes through different things and have different opinions based on those experiences. I wish I could say I was one of those parents who go all out and put all their effort, strength, resources, etc. into "recovering" the child. I WISH I could go to the ends of the earth to cure my son, but I cannot. The harsh reality is that our family lives in Hawaii, and the toll autism (not our son with autism) has taken on our lives has been substantial. The ability to work, rest, play and do everyday life functions are affected by this disorder. I am not equipped in many ways to be able to invest all my time and money into healing my son; but I give as much as I can without running myself into the ground. The reasons I am not able to "go all out" ranges from personal capacity, financial ability, personal support (or lack of), family responsibilities (our family consists of more than our child with autism) and more. Although there are people out there who are able to do this, I have been made to feel ashamed because I have not. We as a community, that has been formed by unfortunate circumstances, should be supporting

one another, not tearing each other down. Life is hard enough as it is - even without a child with autism. Good luck with your study!" --Parent and skills trainer

"In a perfect world, this would be great. But at who's expense would this be? (DOE, private medical insurance, family's pockets, etc.)." --Special education teacher

"It would be important to consider all levels of ASD when designing such a facility, not just the far end. Also important to collaborate for a variety of professionals to get input from all areas. All rooms should consider the impact of sound and other sensory inputs." --Special education teacher

"I am so stressed out from battling the DOE for services, I need this dream come true facility sooner than later!" --Parent

"It would be wonderful to be able to gather all these services together...people and quality of assessment and intervention may trump any physical properties of a center...it is important to balance program cost with facility cost and keep the program afloat and open to all, especially those who cannot private pay...lol." --Clinical director

"I think this is a wonderful survey. I'll be passing this on to my other parents that has children with Autism. GOOD LUCK!" --Parent

"Thank you for doing this." --Parent

"Typically, the cost of providing services in a private sector treatment facility is dependent on many things and should be individually based. Most of the facilities I have heard about are very limited in the number of individuals and families served and are extremely expensive. The severity level of the individuals served would also dictate the facility design and the staffing level needs. Safety issues are very important in this group of individuals and should be taken into account when designing the building and outdoor spaces. Good luck with your project."

--Clinical social worker

"The survey would be easier if you 'froze' the anchors at the top, this way the descriptions of each answer (e.g., no opinion) would remain at the top of the screen as you scrolled down. Sometimes this helps with more accurate answers because it keeps all options in view."

--Behavioral specialist

"Very forward and innovative thinking. You deserve congratulations. Will forward to daughter, who is in special ed. and works with Autism Spectrum children." --Medical professional

“What about adult care facilities? Our island is in GREAT need of crisis homes and facilities to care for the older and aggressive individuals with Autism and there are NO options, as they grow older. We also have no CRISIS CENTER, which is greatly needed. With regards to the list above, I checked some as not as important, because they could easily be accessed during CBI outings with staff. I felt it best to use the space for other needs. Having medical facilities available would be very helpful because obtaining medical treatment has been a nightmare.”

--Parent and special education teacher

“It was tough to just list preferences without the realities of space in Hawaii intruding. In the end, what did I think could get built?” --Clinical psychologist

Obviously lots of good input, and many people would clearly like to see a comprehensive facility for autism come to fruition. An overriding concern, however, is money. Not only what it would cost to construct such a facility, but what the treatment would cost in a facility that has all the bells and whistles. This is obviously an area that needs to be addressed, but is beyond the scope of this report.

### ***Site Visits/Interviews***

Pacific Autism Center. The Pacific Autism Center (PAC), in Kakaako, is probably the most prominent of the autism treatment facilities in Hawaii. They offer applied behavior analysis (ABA) and applied verbal behavior (AVB). PAC currently employs a staff of 16 therapists, to include four behavior analysts. In addition, they have a speech therapist on staff and contract with another, and also contract for the services of two occupational therapists as well. PAC usually has about 10-15 students at any one time. Each child is assigned to their own individual one-to-one therapy room; this allows their specific reinforcers to be stored in their room.

I visited PAC on March 16, 2011, and interviewed the Director of the center, Ms. Laura Cook. Ms. Cook has many outstanding ideas, and discussed not only what they tried to do when they opened the center, but what they would do if they had unlimited space and resources. Many of these things have already been discussed in this report; she also had a few unique ideas. The following are the highlights of our discussion:

- There needs to be a “control point” between the lobby/reception space and the therapy space.
- A dedicated intake room would be beneficial for doing assessments.
- All rooms should be soundproofed.
- They have not yet changed the fluorescent lighting that was part of the space when they occupied it, but it is something they would like to do.
- There should be a monitoring system for every room. This is for safety, liability, and integrity checks for the therapists.
- An intercom system in the rooms would be ideal. This could serve for duress situations (when a therapist needs immediate assistance), and also for more informal communications.
- Lots of storage needed.
- A storage room is specifically needed for the large pads used in Crisis Prevention Intervention (CPI) situations. These pads are used when a child with self-injurious behaviors is having a major meltdown and needs to be protected. They should be in a room adjacent to the therapy space.



- High shelving is required to keep certain items out of the reach of the children.
- A separate occupational therapy room would be ideal, with ball pits, etc.
- An outside play area, with swings, etc., is also desirable.
- A gym would be great.
- Would like to have a kitchen to teach daily living skills.
- Need office space as well – lots of administrative work to take care of.
- The ideal facility would be wired for everything – all the latest information technologies.
- A monitor in the waiting area would be nice, where messages could be displayed for the parents.
- There are no special rooms for speech therapy at PAC; rather, these therapists work in the child's one-to-one therapy room, because that's where their reinforcers are.
- Area rugs are preferable to carpeting, because they are easier to clean.
- Proper furniture is important. U-shaped, adjustable-height tables are used in the main classroom area.
- Sensory play areas with water tables, sand tables, and an art room (with a drain) would be nice to have.
- Should have hooks on the walls to hang up large toys.

- Would like to have an “imagination area.” This would include a play house, clothes for playing dress-up, etc. This would help with the generalization of skills.
- Would like to have a clinical psychologist on staff, to work with families before their child starts their formal program.
- A support group for siblings, with counselors and therapists that specialize in working with kids, would be great.

Autism Behavior Consulting Group (ABC Group). The ABC Group, located in Aiea, uses strictly the applied verbal behavior (AVB) approach. They have three behavioral specialists and 15 tutors on staff (nine of which are in the center at any one time). They have 30 children currently enrolled; however, only 14 that receive therapy in the center (the others receive services in their school and at home). The center is set up with seven individual one-to-one workstations. Seven of the students occupy them during morning sessions, the other seven during afternoon sessions.

I paid a visit to the ABC Group facility on March 24, 2011, and interviewed one of the behavioral specialists, Ms. Anne Lau. As might be expected, she touched on many of the same topics as Laura Cook from PAC, but also had several unique insights as well:

- Location is important; where they are now in Aiea, they can walk the kids to the post office, public library, eating establishments, etc., to teach daily life skills.
- It would be great to have a clinical presence on the staff – developmental pediatrician, clinical psychologist, speech therapist, occupational therapist.

- Would like to offer a pre-school as well.
- A “transition classroom” would be great, where the kids could gradually move from their one-to-one setting, to small group instruction, to progressively larger groups.
- Would like to have a model apartment to teach daily living skills.
- Although they are currently only set up for children ages 2 to 10, vocational rooms for older kids and adults would be something they would like to have if they were to expand services.
- They might also offer other behavioral procedures (in addition to AVB) if resources were not an issue.
- Would like an outdoor play area (currently they have an outdoor area simulated indoors).
- Would like to have a sensory gym.
- Music rooms, art rooms, and computer labs are all great ideas, but can be accommodated in a classroom.
- A flexible space that was designed to simulate different environments (e.g. church, soccer field, etc.) would be wonderful.
- Need bathrooms for kids and adults. Kid’s bathrooms need to accommodate toilet training.
- Need furniture designed for kids.
- Need high shelving (but not too high).

- Need lockable storage cabinets.
- Most storage needs to be designed to keep things out of sight.
- If space were unlimited, it would be nice to have progressively more distracting work areas (step 1, step 2, etc.) that the kids could progress through.
- They have individual storage “caddies” for each child. These are on wheels, and can be easily rolled into an individual treatment area. This flexible arrangement allows any one-to-one station to be used by any student, unlike PAC, where each student has their own room.
- Centralized, “community” storage is preferable for toys.
- The supervisors’ office at ABC is adjacent to the one-to-one treatment space. It would be great if there were a two-way observation mirror between the rooms, so the supervisors could monitor sessions while still doing paperwork at their desks.
- There should be a “line of demarcation” (control point) at the entry area, not only for physical control, but so the child realizes that he or she is moving from an area of “parent’s rules” to one of “school rules.”
- There should be computer space set up for the tutors, because they have to print out a lot of materials.
- Touch screen computers built into individual work-stations would be great.
- Classrooms should be wired for technology.

Loveland Academy. Loveland Academy is located in Makiki, and offers special education services and vocational training to approximately 40 students. There is an emphasis on speech therapy, academics, and vocational training for the older children. The facility itself seems to be a limiting factor, as it is located in two adjacent, old-style apartment buildings (one two-story and one three-story), that are landlocked by other buildings (i.e. no room for expansion). The rooms all have exterior access, making control an issue. In addition, the upper floors present a jumping hazard.

I visited Loveland on March 16, 2011, and interviewed Mr. Shannon Tsubaki, Case Manager/Supervisor. Our discussion centered more on the space they currently have, rather than what they would like to have. They do have a wide variety of spaces, which include:

- Four dedicated speech therapy rooms
- An occupational therapy room
- A science room
- An art studio
- A computer room
- A ceramics room
- A library/break room
- An assessment/testing room
- A psychologist's room
- A garden

Loveland also operates a farm in Kaneohe, and they bus students there to work in the field. They are in the process a building a store there, where the students can learn to buy and sell the goods produced on the farm.

All three facilities visited would offer additional services if resources were unlimited. The extent of these services would still be tied to the respective philosophies of the leadership at each establishment, but there would no doubt be more choices for parents and more comprehensive treatment for the children.

### ***Conclusions***

From an overall standpoint, the survey and site visits/interviews provided valuable feedback that served to validate the intent and direction of this research effort, in addition to providing ideas for additional spaces to be considered for the criteria document. Specifically, the following spaces will be included:

- Intake Room
- Reception/Administrative Area
- Office Space for Behavioral Therapists, Case Managers, etc.
- Administrative Space for Skill Trainers
- Daily Living Skills Area
- Pediatric Counseling Rooms
- Storage Rooms
- Water Play Area or Pool (part of the Exterior Play Area)
- Adult and Children's Restrooms

The original list of rooms and spaces that could be programmed into a comprehensive autism treatment, resource, and support center was revised to include these additional requirements. No spaces were deleted; all of the original spaces are deemed appropriate for inclusion.

Based on the research conducted, and the revised list of rooms/spaces, we now have a starting point for the development of the planning and programming criteria document.

## **CHAPTER 7: PLANNING/PROGRAMMING CRITERIA GUIDE**

### ***Introduction***

The purpose of the planning and programming criteria document is to determine the space requirements for a new facility. The determination of space requirements is really a two-phase process:

- 1) The development of a functional area space program, based on a given set of criteria, and driven by inputs on projected student population served.
- 2) The review and editing of the document produced from step one, to ensure end-user requirements are being met, and to examine the program for potential efficiencies based on the user's proposed concept of operations (e.g., the possibility of consolidating certain support functions, creating multi-function rooms, etc.).

The planning and programming criteria document is intended to address the requirement of phase one – the creation of a functional area space program – with an efficient and user-friendly process. With a draft space program in hand, it is then the designer's job to work with the client on phase two, finalizing the program. In addition, the criteria document provides functional relationship diagrams to aid in preliminary design concepts.

It should be noted that proposed staffing could be used as the input that drives the space program, rather than the student population. However, in keeping with the



patient-centered concept inherent in this research project, it is felt that ATRSCs should be designed to meet the projected workload, and the facility then staffed according to that workload. Understanding that some entities may have their staff that they are comfortable with, and desire a facility that can treat “X” number of students based on that staff, it is not the intent of this project to follow that model. Although the criteria guide can still be used in that fashion, it is the author’s belief that access to treatment should be offered to all those who need it, and therefore student population should be the primary driver in developing the space requirements.

### ***Planning/Programming Criteria Guide***

The planning and programming guide is outlined on the following pages in narrative format. The criteria has also been incorporated into an Excel spreadsheet, with embedded formulas to facilitate the planning and programming process. Examples of this are shown at the end of the guide, with screen capture images shown from the actual program. Printouts of all the Excel worksheets are included as an appendix to the Planning and Programming Criteria Guide. The working version of the Excel spreadsheet is a separate product from this report.

The planning and programming criteria document is intended to be a “pull-out” guide, i.e. it can be taken out of this report and used as a stand-alone product. Along with the Excel spreadsheet loaded on a laptop, this will facilitate the use of the product in the field.

The information in this chapter has been adapted from two primary sources:  
Department of Defense Space Planning Criteria for Health Facilities (28 January 2002),  
and Department of Defense Education Activity Education Facilities Specifications—  
Elementary School (4 June 2010).

# Planning and Programming Criteria Guide for Autism Treatment, Resource and Support Centers

## Table of Contents

Abbreviations	1
Overview	2
Step-by-Step Process	
Step One – Define the Student Population	4
Step Two – Define the Services that will be Offered	4
Step Three – Define the Staffing	6
Step Four – Calculate the Space Requirements	8
1. Educational Spaces	8
2. Clinical Spaces	11
3. Support Spaces	24
4. Net-to-Gross Conversion	27
Overall Functional Relationships	28
Examples from the Excel Spreadsheet Version of the Criteria Guide	34
Appendix A: Worksheets from the Excel Spreadsheet Version of the Criteria Guide	37

## Abbreviations

ATRSC	Autism Treatment, Resource, and Support Center
DIR	Developmental Individual Difference Relation-Based Intervention
fMRI	Functional Magnetic Resonance Imaging
FTE	Full-Time Equivalent
HBOT	Hyperbaric Oxygen Therapy
OT	Occupational Therapy
PPCG	Planning and Programming Criteria Guide
PT	Physical Therapy
RDI	Relationship Development Intervention
SCERTS	Social Communication Emotional Regulation Transactional Support Model
SF	Square Feet
SPECT	Single-Photon Emission Computed Tomography
ST	Speech Therapy
TEACCH	Treatment and Education of Autistic and Communication related handicapped Children

## **Overview**

The purpose of this guide is to provide functional space criteria that can be used in the planning and programming of Autism Treatment, Resource and Support Centers (ATRSCs).

The planning and programming of ATRSCs should take into account educational, clinical, and support service functions. The process has four steps:

- 1) Define the student population.
- 2) Define the services that will be offered.
- 3) Define the required staffing.
- 4) Calculate the space requirements.

The information gathered in Steps 1 and 2 will help determine the requirements of Step 3. Collectively, Steps 1-3 provide the information that is necessary to complete Step 4. In addition, by completing these steps, it ensures that designers and their clients are considering all possibilities when planning a new facility, in terms of the population to be served, the range of services offered, and the staffing required to provide those services to the projected population. Defining these parameters is also useful in establishing early budgetary requirements. Furthermore, completing these steps induces the client, or end-user, to consider the possibility of services offered through alternative means. For example, some services might be available in the local community; space could be built into the ATRSC for specific functions and then leased to individual service providers; the center could be part of a development that co-locates

the core functions of the ATRSC with other tenants, such as the grocery store; etc.

There are obviously a variety of arrangements that could be used to meet the ultimate goal of providing comprehensive autism services, all of which should be considered in order to provide a facility that meets the needs of students with autism and their families.

Step 4, calculating the space requirements, is done on a departmental basis. Each section consists of the space criteria, followed by a functional relationship diagram for that department. The final part of Step 4 is the net-to-gross conversion. Net-to-gross conversion ratios are provided, which are used to establish the overall square footage of the proposed facility. This number can then be used for preliminary cost estimates and budgeting purposes.

Overall functional relationship diagrams are presented in the section following the step-by-step process. These diagrams are color-coded: blue for educational areas, green for clinical areas, and red for support spaces.

For planning purposes, staffing numbers should be based on full-time equivalents (FTEs). One FTE is based on an eight-hour work day and a 250-day work year.

## ***Step-by-Step Process***

### **Step One – Define the Student Population**

*Please enter below the projected number of students served in each age group:*

0-3: \_\_\_\_\_

3-5: \_\_\_\_\_

5-10: \_\_\_\_\_

Over 10: \_\_\_\_\_

**TOTAL:** \_\_\_\_\_ *(This number will be used for various calculations)*

### **Step Two – Define the Services that will be Offered**

*Please mark all services that are intended to be provided in the facility:*

#### **Educational**

\_\_\_\_\_ Applied Behavior Analysis *(Complete Section 1 of Step 4)*

\_\_\_\_\_ Applied Verbal Behavior *(Complete Section 1 of Step 4)*

\_\_\_\_\_ Pivotal Response Training *(Complete Section 1 of Step 4)*

\_\_\_\_\_ TEACCH *(Complete Section 1 of Step 4)*

\_\_\_\_\_ D.I.R. (Floortime) *(Complete Section 1 of Step 4)*

\_\_\_\_\_ RDI *(Complete Section 1 of Step 4)*

\_\_\_\_\_ SCERTS *(Complete Section 1 of Step 4)*

\_\_\_\_\_ Music Therapy *(Complete Section 1 of Step 4)*

\_\_\_\_\_ Art Classes *(Complete Section 1 of Step 4)*

\_\_\_\_\_ Computer-Based Programs *(Complete Section 1 of Step 4)*

\_\_\_\_\_ Daily Living Skills *(Complete Section 2.B of Step 4)*

## **Clinical**

\_\_\_\_\_ Bio-Medical Treatments *(Complete Section 2.A of Step 4)*

\_\_\_\_\_ Speech Therapy *(Complete Section 2.A of Step 4)*

\_\_\_\_\_ Nutritional Counseling *(Complete Section 2.A of Step 4)*

\_\_\_\_\_ Dental Treatment *(Complete Section 2.A of Step 4)*

\_\_\_\_\_ Occupational Therapy *(Complete Section 2.B of Step 4)*

\_\_\_\_\_ Physical Therapy *(Complete Section 2.C of Step 4)*

\_\_\_\_\_ Compounding Pharmacy *(Complete Section 2.D of Step 4)*

*(If not provided, is this service available in the local community? Yes / No )*

\_\_\_\_\_ Clinical Laboratory *(Complete Section 2.E of Step 4)*

*(If not provided, is this service available in the local community? Yes / No )*

\_\_\_\_\_ Diagnostic Imaging – fMRI or SPECT *(Complete Section 2.F of Step 4)*

*(If not provided, is this service available in the local community? Yes / No )*

\_\_\_\_\_ Hyperbaric Oxygen Therapy (HBOT) *(Complete Section 2.G of Step 4)*

## **Support Services**

\_\_\_\_\_ Specialized Grocery Store *(Complete Section 3 of Step 4)*

*(If not provided, is this service available in the local community? Yes / No )*

\_\_\_\_\_ Marriage/Family Counseling *(Complete Section 3 of Step 4)*

\_\_\_\_\_ Financial Counseling *(Complete Section 3 of Step 4)*

- \_\_\_\_\_ Legal Services *(Complete Section 3 of Step 4)*
- \_\_\_\_\_ Bookstore *(Complete Section 3 of Step 4)*
- \_\_\_\_\_ Cafeteria *(Complete Section 3 of Step 4)*
- \_\_\_\_\_ Chapel *(Complete Section 3 of Step 4)*
- \_\_\_\_\_ Barber Shop *(Complete Section 3 of Step 4)*
- \_\_\_\_\_ Additional space for training, support groups, etc. *(Complete Section 3 of Step 4)*

*Can any of the above listed services be provided through co-located facilities that are operated by separate entities (e.g. pharmacy, lab, imaging, grocery store, barber shop, counseling, legal services, etc.)?* \_\_\_\_\_

### **Step Three – Define the Staffing**

*Based on the projected student population and the services offered, identify the appropriate staffing for the facility. Numbers should represent full-time equivalents (FTEs) for each position:*

- \_\_\_\_\_ Director
- \_\_\_\_\_ Administrative Personnel
- \_\_\_\_\_ Behavior Intervention Support Specialist (BISS)
- \_\_\_\_\_ Special Education Teacher
- \_\_\_\_\_ Skills Trainer
- \_\_\_\_\_ Music Teacher



\_\_\_\_\_ Art Teacher

\_\_\_\_\_ Doctor

\_\_\_\_\_ Nurse

\_\_\_\_\_ Speech Therapist

\_\_\_\_\_ Dietician

\_\_\_\_\_ Dentist

\_\_\_\_\_ Dental Assistant

\_\_\_\_\_ Oral Hygienist

\_\_\_\_\_ Occupational Therapist

\_\_\_\_\_ Physical Therapist

\_\_\_\_\_ Pharmacist

\_\_\_\_\_ Pharmacy Technician

\_\_\_\_\_ Clinical Laboratory Director

\_\_\_\_\_ Clinical Laboratory Technician

\_\_\_\_\_ Radiology Technician

\_\_\_\_\_ HBOT Technician

\_\_\_\_\_ Grocery Store Employee

\_\_\_\_\_ Family/Marriage Counselor

\_\_\_\_\_ Financial Counselor

\_\_\_\_\_ Legal Personnel

\_\_\_\_\_ Bookstore Employee

\_\_\_\_\_ Cafeteria Employee

\_\_\_\_\_ Barber

\_\_\_\_\_ Other (Specify: \_\_\_\_\_)

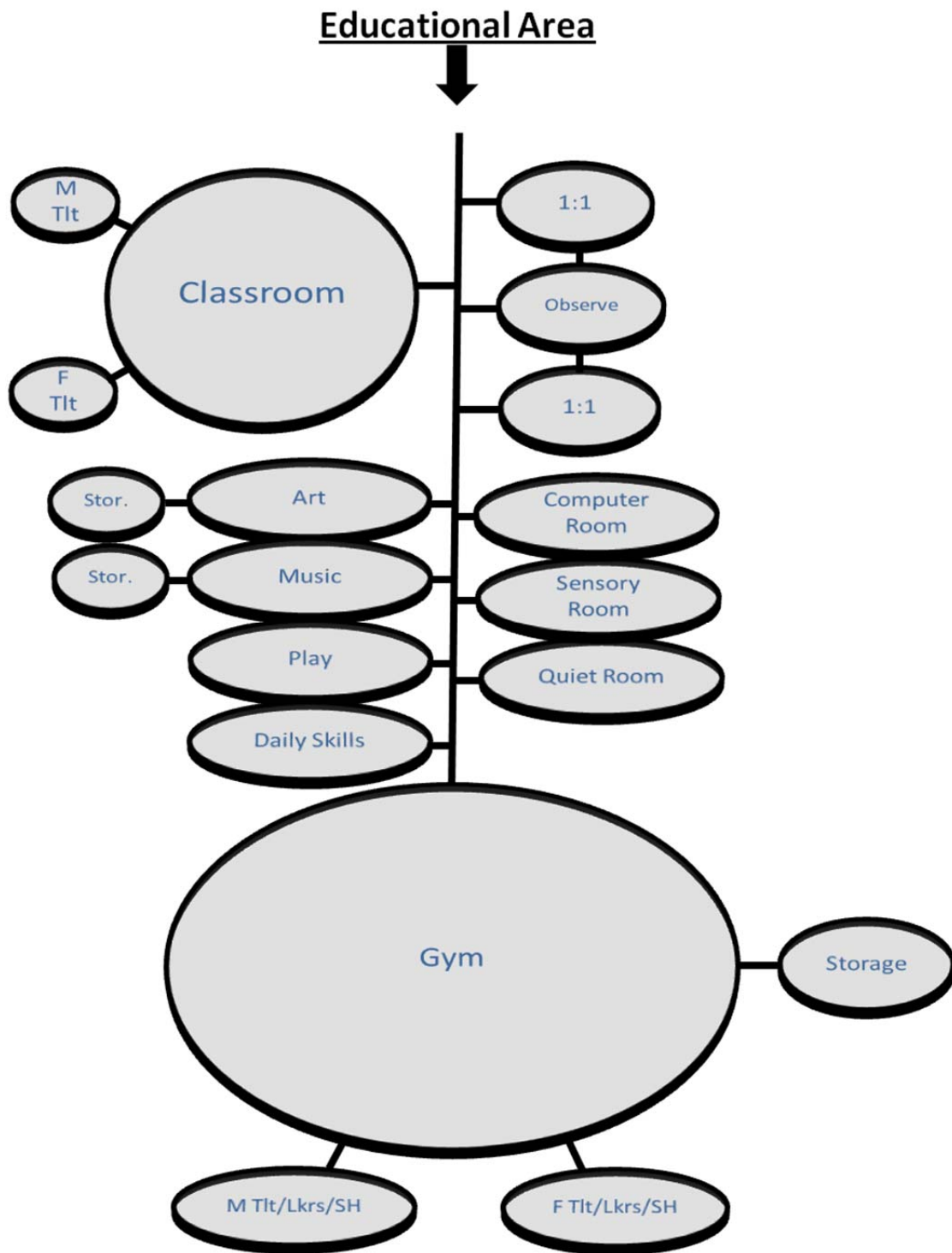
#### **Step Four – Calculate the Space Requirements**

*Based on the services and staffing selected above, check the rooms/functions that you wish to be included in the facility, and then apply the corresponding criteria. This will result in a preliminary room-by-room space program for the facility, that can then be further refined through the design process.*

#### **1. Educational Spaces**

✓	Room/Function	Net Square Feet	Planning Notes
	Group Classroom (15 Students)	750	750 SF is standard size classroom for 15 students (50 SF per student). Includes built-in storage units. Larger classrooms may be programmed to accommodate staff training, meetings, etc., but student class size should be limited to 15.
	Toilets	50	Two (one male, one female) per group classroom.
	Individual (one-to-one) Classroom	60	One per FTE skills trainer.
	Observation Room	60	Minimum, for one observer. Add 20 SF for each additional person, based on number of observers desired to accommodate. Place between individual classrooms.
	Quiet Room	100	Minimum. One per classroom.
	Play Room	200	Minimum. One per center. 15 SF per student (600 SF maximum).

	Sensory Room	100	Minimum. One per center. 10 SF per student (300 SF maximum).
	Music Room	400	Minimum. 50 SF per student; maximum 15 students per class (750 SF maximum).
	Music Room Storage	100	Minimum. 25% of Music Room.
	Art Room	400	Minimum. 40 SF per student; maximum 15 students per class (400 SF maximum).
	Art Room Storage	100	Minimum. 25% of Art Room.
	Computer Lab (6 workstations)	200	Minimum. 35 SF per computer work station.
	Gymnasium	5,075	Accommodates standard basketball court.
	Gymnasium Storage	400	Minimum.
	Gymnasium Toilets/Lockers/ Showers	150	Each. One male, one female.
	Daily Living Skills	400	Minimum. Program if function is desired, but not included in a separate Occupational Therapy department (section 2.B). This is a suite that consists of a living room, kitchen, and bathroom. Add 150 SF to include a bedroom.



*Figure 1: Functional Relationships of the Educational Area*

## 2. Clinical Spaces

A. Primary Care Clinic: This clinic includes space for DAN! doctors (bio-medical treatments), speech therapy, nutritional counseling, and dental services.

✓	Room/Function	Net Square Feet	Planning Notes
	Waiting Room	120	Minimum, if separate clinical waiting is desired. Otherwise, consider using main ATRSC waiting area. Provide 5 seats for each FTE provider (doctor, speech therapist, dietician, dentist); 16 SF for 95% of seats and 25 SF for 5% of seats.
	Patient Toilet	50	One male, one female (if clinical waiting is programmed)
	Reception	120	Minimum, if separate clinical reception is desired. Otherwise, consider using main ATRSC reception area. Add 60 SF for each employee > 2 seated in this area.
	Patient Records Storage	100	Minimum. Divide total # of patient records by 16, then multiply by the shelf factor (.504 for 5 shelf units or .42 for 6 shelf units). For medical and dental records.
	Screening Room	100	Not required if screening will be accomplished in Exam Room.
	Exam Room	100	Two per FTE Doctor.
	Treatment Room	175	One per clinic.
	Doctor's Office	100	One per FTE Doctor.
	Nurse's Office	100	One per FTE Nurse.
	Speech Therapist's Office	100	One Per FTE Speech Therapist.
	Dietician's Office	120	One per FTE Dietician.
	Dental Treatment Room, General	150	One per FTE dentist. Consider two rooms per FTE dentist if workload demand is high.
	Dental Treatment Room, Oral Hygiene	150	One per Oral Hygienist.

	Dental Sterile Room	150	Combined room includes decontamination (with sink), instrument wrapping, sterilizing, and clean storage.
	Dentist's Office	100	One per FTE Dentist.
	Clean Linen/Utility Room	120	One per clinic.
	Soiled Linen/Utility Room	100	One per clinic.
	Staff Toilet	50	Consider separate male and female toilets based on staffing.
	Storage Room	200	Minimum. For equipment, forms/literature, etc.
	Crash Cart Alcove	20	One per clinic.
	Housekeeping Closet	20	One per clinic.

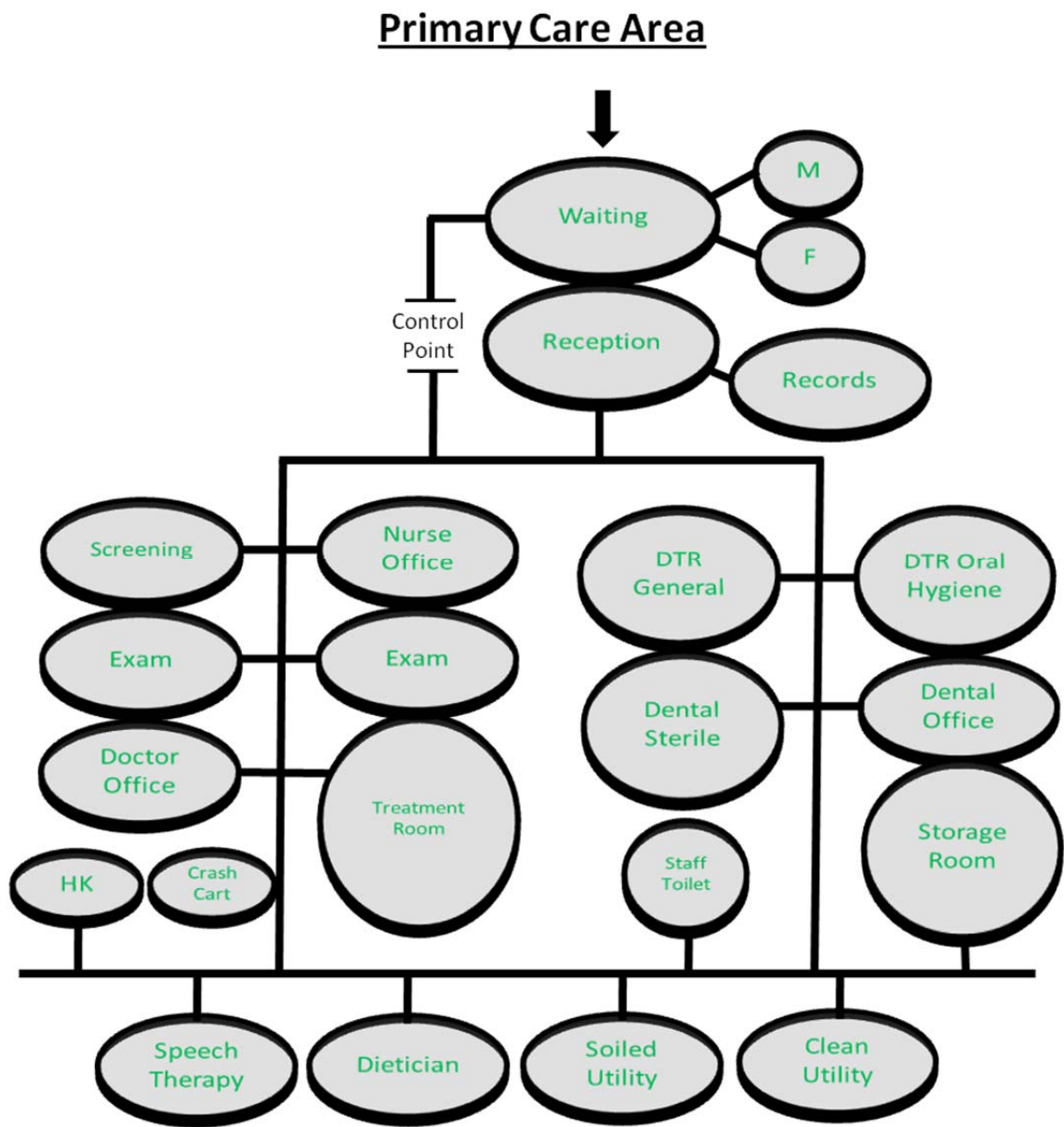
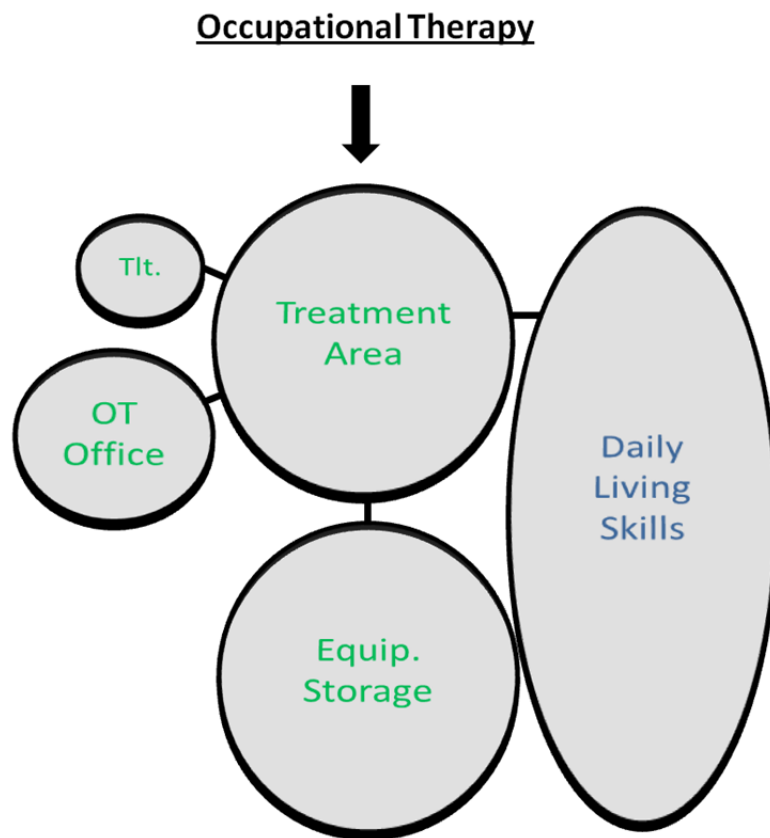


Figure 2: Functional Relationships of Primary Care Clinic

B. Occupational Therapy

✓	Room/Function	Net Square Feet	Planning Notes
	Treatment Area	200	Minimum.
	Daily Living Skills	400	Minimum. This is a suite that consists of a living room, kitchen, and bathroom. Add 150 SF to include a bedroom.
	OT Office	100	1 per FTE Occupational Therapist.
	Patient Toilet	50	1 per clinic.
	Equipment Storage	200	Minimum.

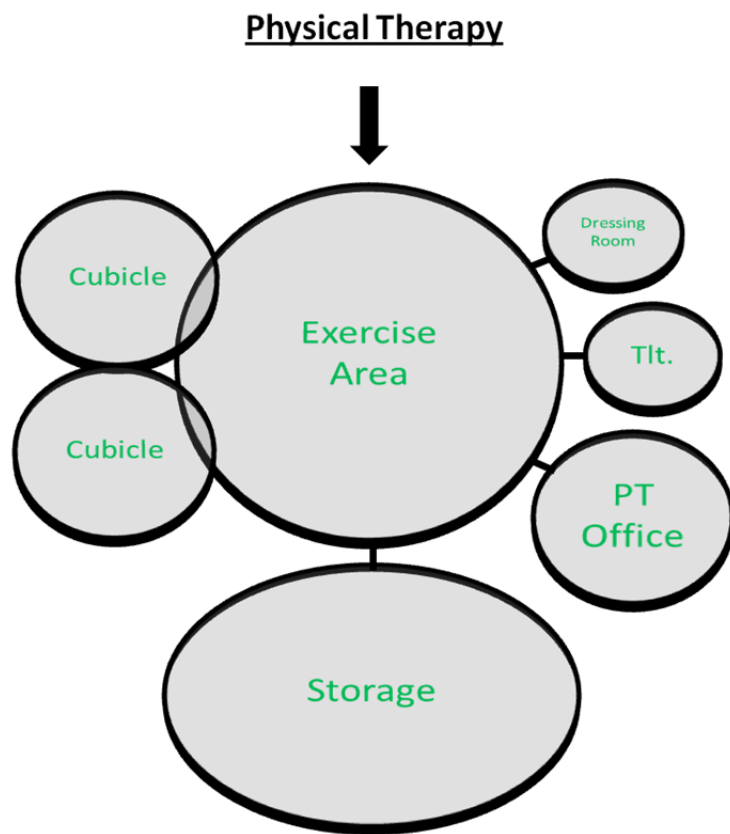


*Figure 3: Functional Relationships of Occupational Therapy*



C. Physical Therapy

✓	Room/Function	Net Square Feet	Planning Notes
	PT Exam Room	120	1 per FTE Physical Therapist.
	Treatment Cubicle	110	Two cubicles per clinic.
	Exercise Area	200	Minimum.
	Dressing Room	60	One per clinic.
	PT Office	100	One per FTE Physical Therapist.
	Patient Toilet	50	One per clinic.
	Storage Room	200	Minimum. For equipment, supplies, linen.



*Figure 4: Functional Relationships of Physical Therapy*

D. Compounding Pharmacy

✓	Room/Function	Net Square Feet	Planning Notes
	Waiting Area	200	Minimum. Provide 16 SF per seat if more than 12 seats are required. Consider joint waiting area with Clinical Laboratory and Diagnostic Imaging functions.
	Dispensing/Storage Area	650	One per Pharmacy.
	Manufacturing/Pre-Pack Area	80	One per Pharmacy.
	Compound Sterile Preparation Area	180	One per Pharmacy.
	Bulk Storage	460	One per Pharmacy.
	Pharmacist Office	100	One per FTE Pharmacist. Also serves as consultation room.
	Staff Toilet	50	One per Pharmacy.
	Housekeeping Closet	20	One per Pharmacy.

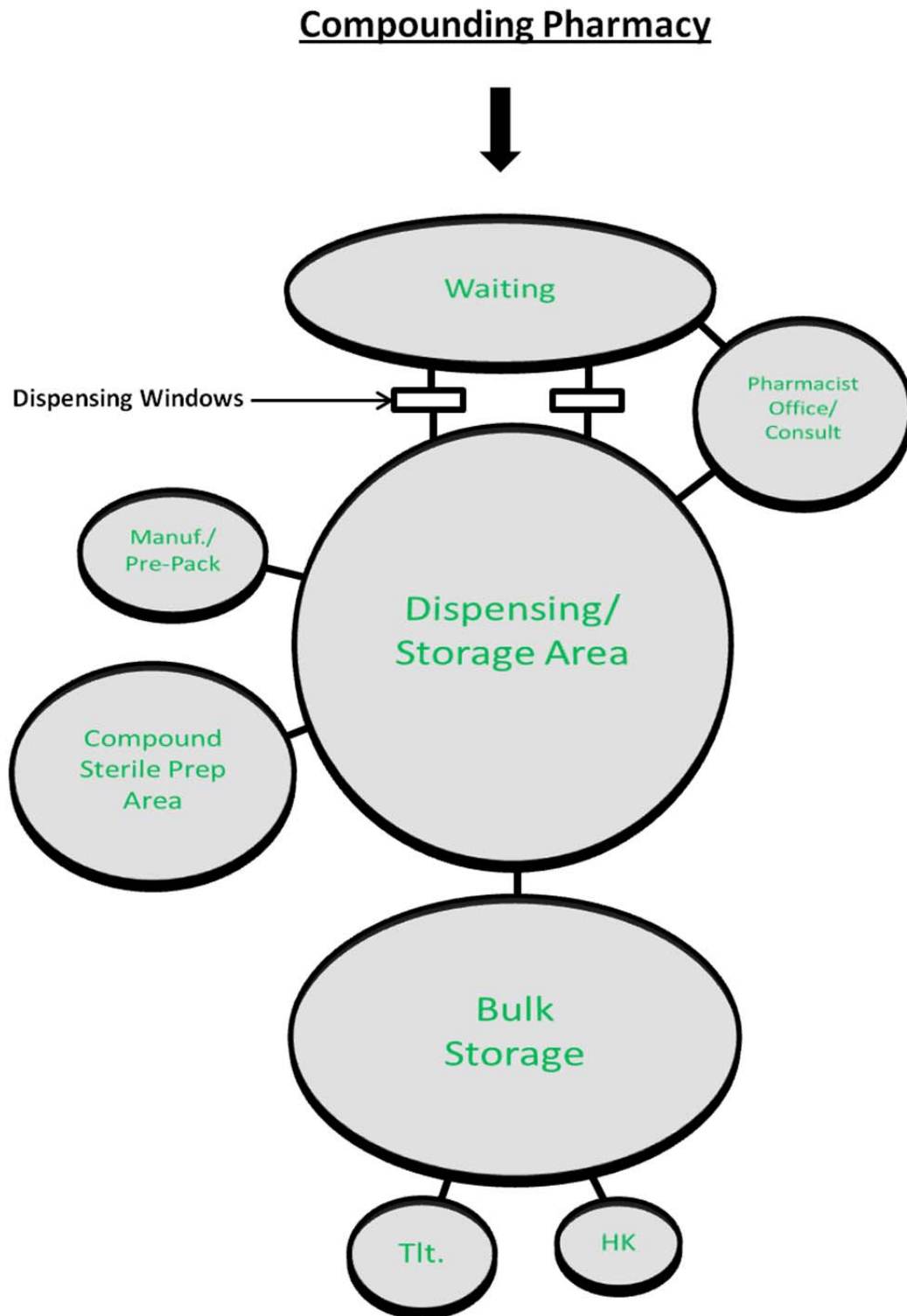
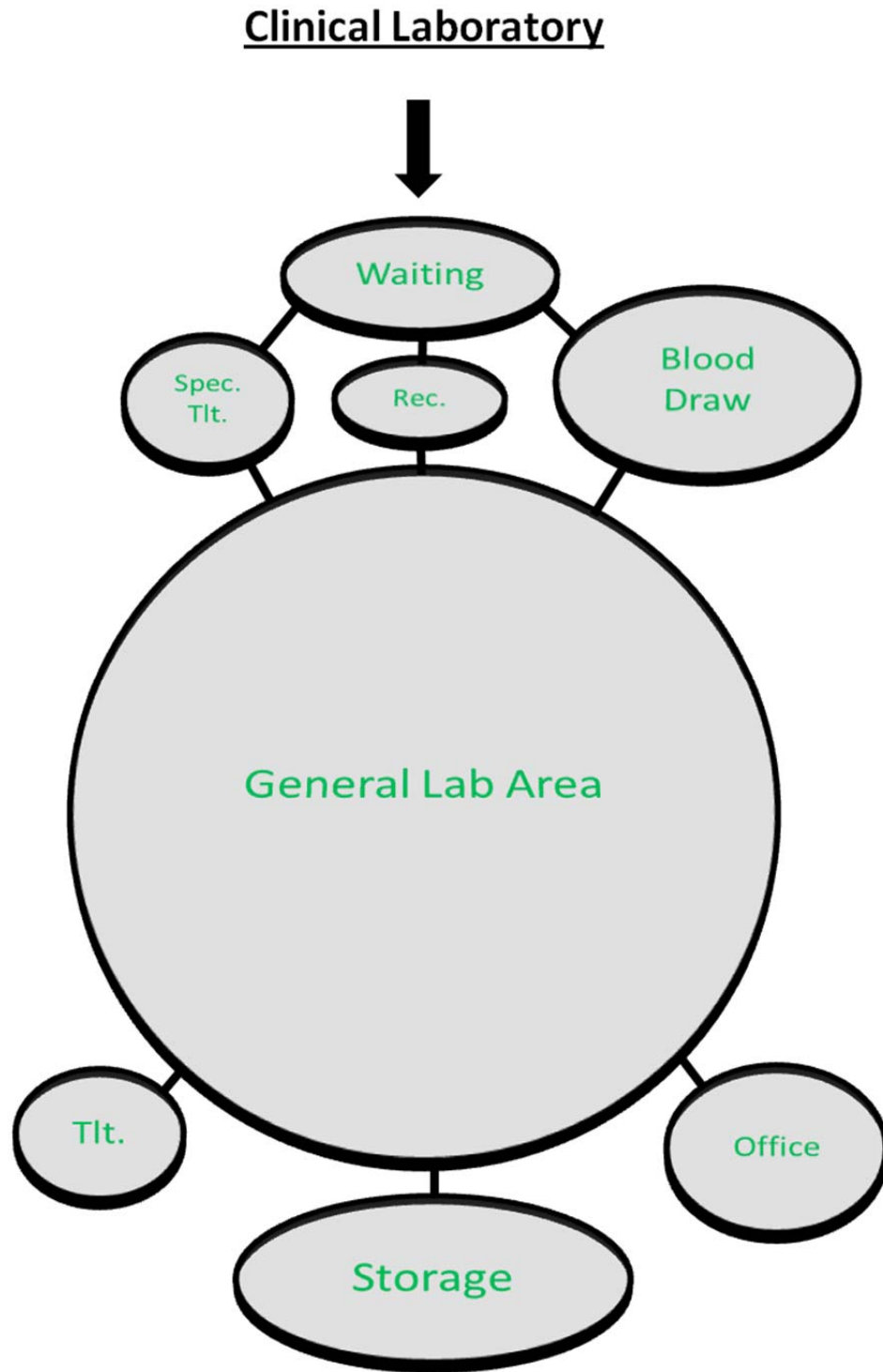


Figure 5: Functional Relationships of Compounding Pharmacy

E. Clinical Laboratory

✓	Room/Function	Net Square Feet	Planning Notes
	Waiting Area	100	Minimum. Provide 16 SF per seat if more than 6 seats are required. Consider joint waiting area with Compounding Pharmacy and Diagnostic Imaging functions.
	Reception	40	Minimum. One per Lab.
	Specimen Collection Toilet (Unisex)	50	One per Lab.
	Blood Drawing Room	200	One per Lab. Minimum for 2 blood draw stations. Add 60 SF for each additional station.
	General Lab Area	950	Includes chemistry, hematology, and urinalysis. Accommodates 3 lab technicians.
	Storage Room	150	Minimum. One per Lab.
	Director's Office	100	One per FTE Laboratory Director.
	Staff Toilet	50	One per Lab.



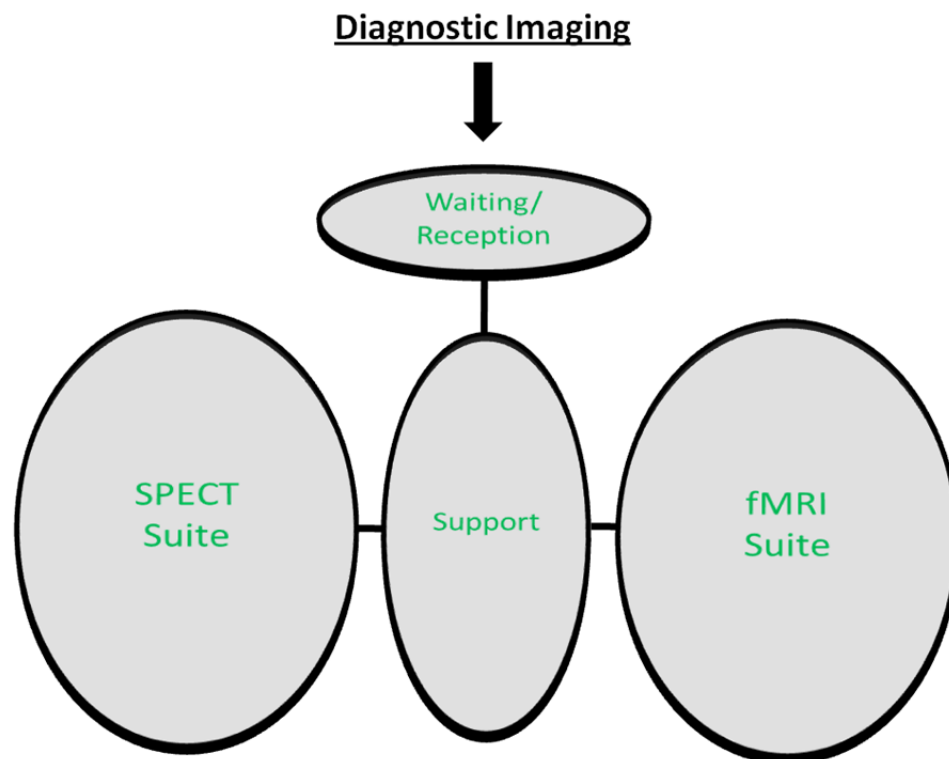
*Figure 6: Functional Relationships of Clinical Laboratory*

F. Diagnostic Imaging: This clinic includes an fMRI suite and a SPECT-Scan suite.

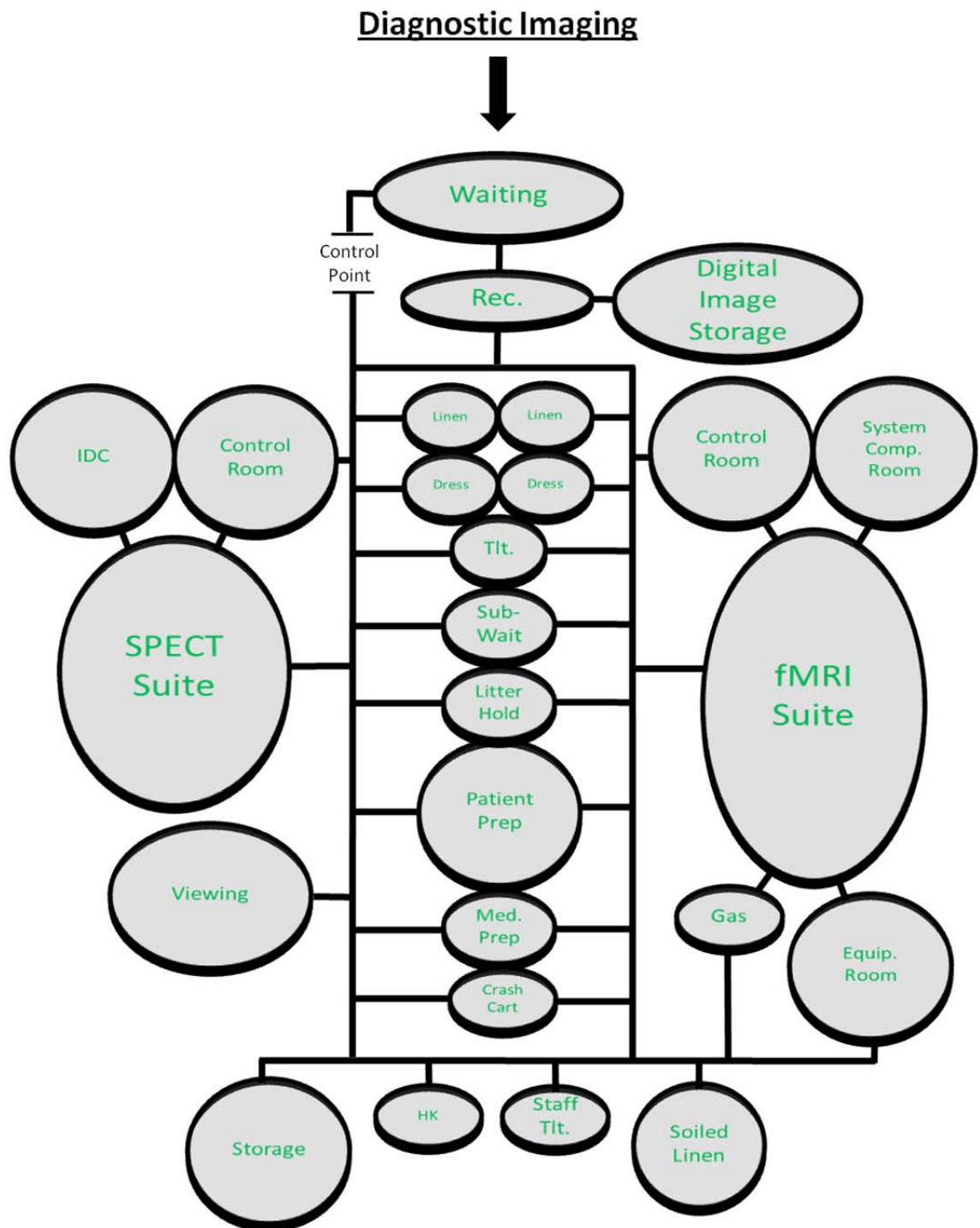
Concept of operations is based on digital imaging, procedures administered by radiology technicians, and images being sent to another facility for reading.

✓	Room/Function	Net Square Feet	Planning Notes
	Waiting Area	100	Minimum. Provide 16 SF per seat if more than 6 seats are required. Consider joint waiting area with Compounding Pharmacy and Clinical Laboratory functions.
	Reception	40	One per department.
	Dressing Room	50	One per scanning room.
	Patient Litter Holding	60	One per two scanning rooms.
	Patient Sub-Waiting	60	One per two scanning rooms.
	Patient Toilet	50	One per two scanning rooms.
	Patient Preparation	120	One per two scanning rooms.
	Medication Preparation Station	60	One per two scanning rooms.
	fMRI Scanning Room	500	Minimum.
	fMRI Control Room	100	One per fMRI Scanning room.
	fMRI System Component Room	150	One per fMRI Scanning room.
	fMRI Gas Storage	60	One per fMRI suite.
	fMRI Equipment Room	280	One per fMRI suite.
	SPECT Scanning Room	300	Minimum.
	SPECT Control Room	120	One per SPECT Scanning room.
	SPECT Independent Display Console	120	One per SPECT Scanning room.

	Viewing Room	150	One per two scanning rooms.
	Digital Image Storage	120	Minimum. One per department.
	Litter/Wheelchair Storage Alcove	40	One per two scanning rooms.
	Clean Linen Alcove	10	One per scanning room.
	Soiled Linen	80	One per department.
	Storage Room	100	Minimum. One per department.
	Staff Toilet	50	Consider separate male and female toilets based on staffing.
	Crash Cart Alcove	20	One per department.
	Housekeeping Closet	20	One per department.



*Figure 7: General Functional Relationships of Diagnostic Imaging*



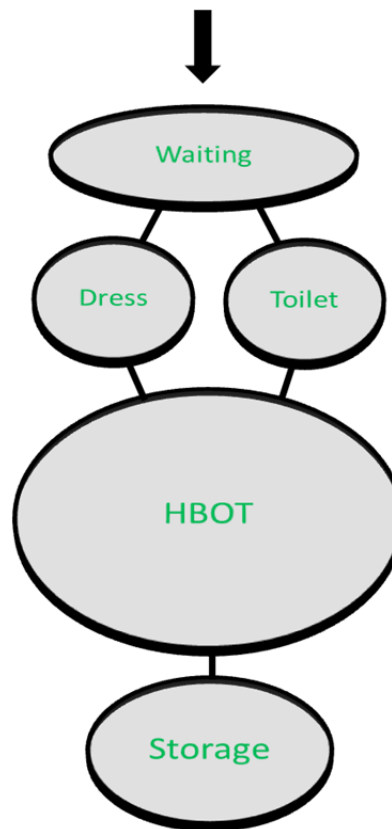
*Figure 8: Detailed Functional Relationships of Diagnostic Imaging*



G. Hyperbaric Oxygen Therapy

✓	Room/Function	Net Square Feet	Planning Notes
	Waiting Room	100	Consider joint waiting area with other ancillary functions.
	Dressing Room	50	One per department.
	Patient Toilet	50	One per department.
	HBOT Treatment Room	200	Per chamber.
	Storage Room	100	One per department.

Hyperbaric Oxygen Therapy



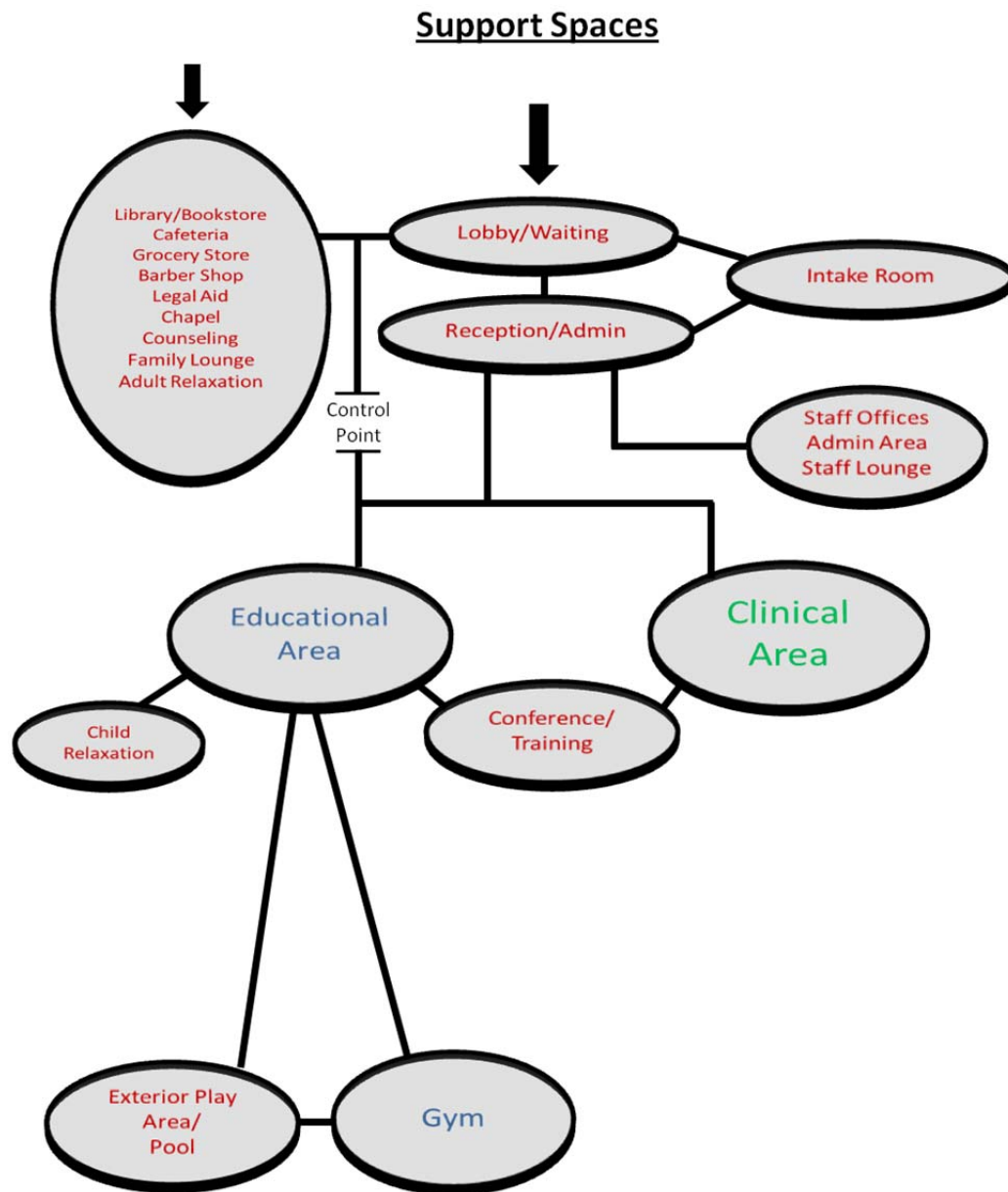
*Figure 9: Functional Relationships of Hyperbaric Oxygen Therapy*

### 3. Support Spaces

✓	Room/Function	Net Square Feet	Planning Notes
	Lobby/Waiting Area	200	Minimum, if separate waiting areas are provided in clinical spaces. Accommodates 12 seats. If combined with clinical waiting, area should be a minimum of 320 SF. Provide 16 SF for 95% of seats and 25 SF for 5% of seats. Include public toilets.
	Reception/Administration	200	Minimum. Add 60 SF for each employee >3 seated in this area.
	Intake Room	100	One per center.
	Director's Office	120	One per center.
	Staff Office (Behavioral Specialist, Case Manager, SPED Teacher, etc.)	100	One per supervisory staff personnel.
	Administrative Area for Skills Trainers	120	Minimum. Add 60 SF for each Skills Trainer >2 seated in this area.
	Library/Bookstore	400	Minimum.
	Cafeteria/Snack Bar (10 seats)	400	Minimum for a 10-seat food service vendor space, or a "serve only" kitchen (one that dispenses food prepared elsewhere). Add 18 SF per seat for additional seating, and additional space as required by vendor. If a full service kitchen/cafeteria is desired, consult with a food service specialist. Space is allocated based on the number of meals served (or total student/staff population) and size requirements of the food service equipment.
	Specialized Grocery Store	800	Minimum. Space leased to a chain vendor can range from 4,000-10,000 SF (e.g. Down to Earth) to 35,000-55,000 (e.g. Whole Foods).
	Parent/Family Lounge	400	One per center.

	Conference/Training Room	600	Minimum one per center, unless function can be accommodated in the Group Classroom(s), if included.
	Barber Shop (1 chair)	150	Minimum. Add 60 SF for each additional chair.
	Family/Marriage Counseling Room	150	Minimum. One per center.
	Pediatric Counseling Room	150	Minimum. One per center.
	Financial Counseling Office	120	Minimum. One per center.
	Legal Aid Office	120	Minimum. One per center.
	Chapel/Meditation Room	120	Minimum for a meditation room only. For a full chapel (with altar and chancel), minimum 335 SF for a 30-seat chapel.
	Relaxation Room (Adult)	150	One per center.
	Relaxation Room (Child)	250	Minimum one per center. One per classroom is ideal.
	Storage Rooms	200	Minimum, as required throughout the facility.
	Restroom – Adult	60	As required throughout facility, per International Plumbing Code.
	Restroom – Children	100	As required throughout facility, per International Plumbing Code.
	Staff Lounge	150	Minimum. One per center.
	Communications Room	100	One per 10,000 GSF of building.
	Housekeeping Closet	40	One per 10,000 GSF of building (if Compounding Pharmacy is included, provide dedicated closet within secure area of pharmacy).
<b>Exterior Areas (Not included in building square footage calculations)</b>			
	Exterior Play Area	*	The exterior play area should be maximized based on the available space at the site, but should be a minimum of 3,000 SF.
	Water Play Area/Pool (part of Exterior Area)	*	Size based on exterior area available at the site.

As the support spaces are scattered throughout the facility, their functional relationships are shown within the context of the facility as a whole.



*Figure 10: Functional Relationships of Support Spaces*

#### 4. Net-to-Gross Conversion

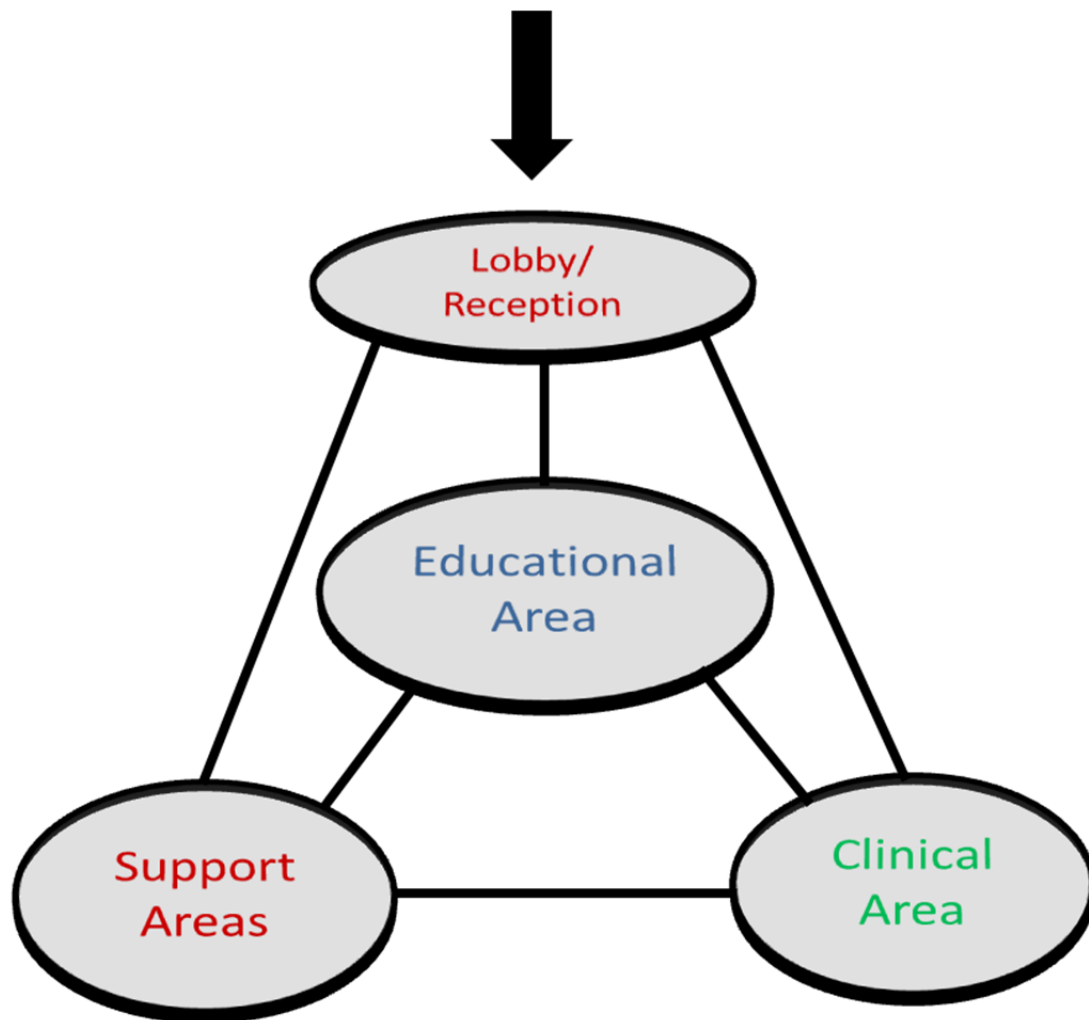
Net-to-gross conversion factors are provided for each department. The resulting gross areas for each department should be added together, and then the building net-to-gross factor applied to determine the overall gross area of the building.

Department	Net-to-Gross Ratio
Educational Area	1.3
Primary Care Clinic	1.35
Occupational Therapy	1.3
Physical Therapy	1.3
Compounding Pharmacy	1.25
Clinical Laboratory	1.25
Diagnostic Imaging	1.5
Hyperbaric Oxygen Therapy	1.25
Support Spaces	1.4

Building	Net-to-Gross Ratio
Building Net-to-Gross	1.3

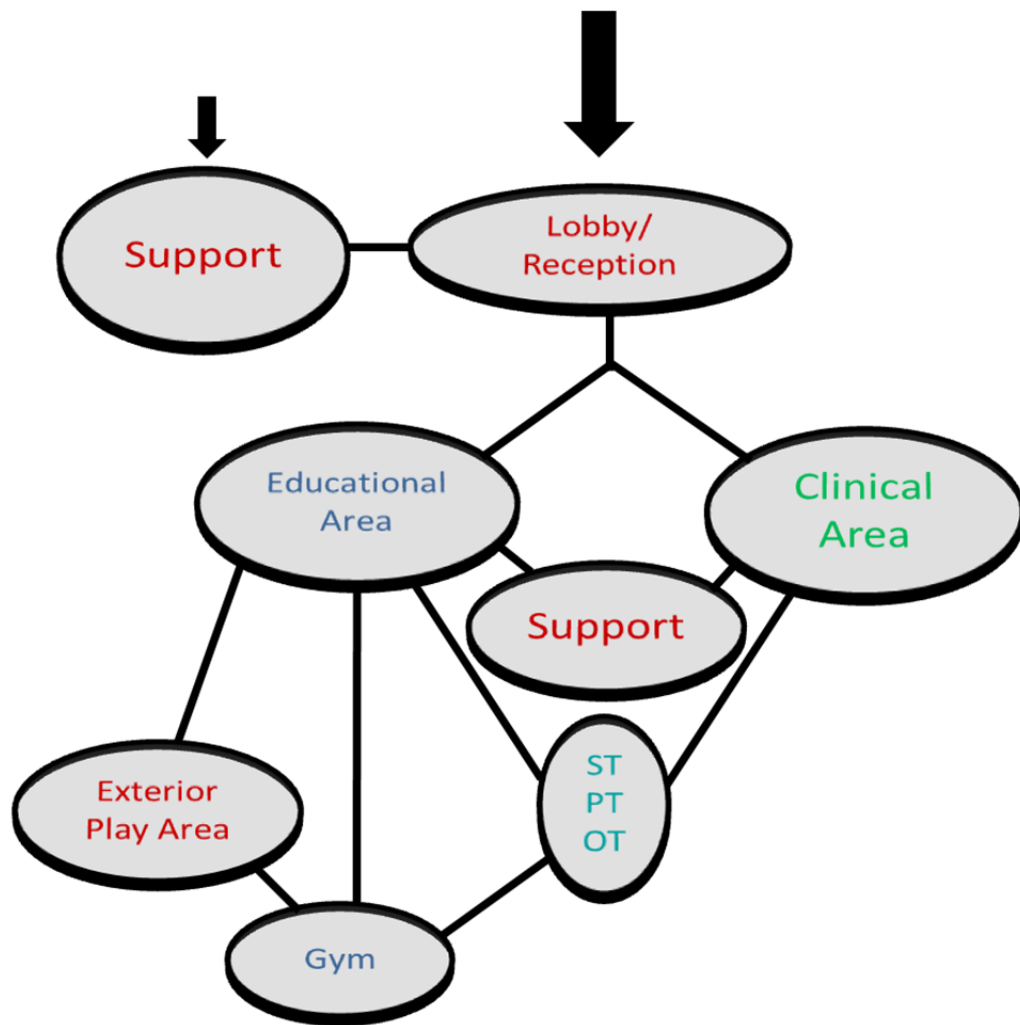
### ***Overall Functional Relationships***

This report so far has classified the rooms and spaces into educational, clinical, and support spaces. In the following series of bubble diagrams, the relationships between these spaces are further developed. Figure 11 shows the basic relationship of the main entry point and the primary areas of the facility.



*Figure 11: Basic Functional Relationships*

As the relationships are further developed, it can be seen that the support spaces have relationships throughout the facility, and there are some shared functions between the educational and clinical spaces (speech therapy, physical therapy, occupational therapy, and support). Figure 12 also shows the possibility of a secondary entrance for a group of the support spaces.



*Figure 12: Expanded Functional Relationships*

The relationships shown in Figure 12 are further expanded to show an additional level of detail. Figure 13 also shows another secondary entrance, to the ancillary services area of the clinical space, as well as a control point.

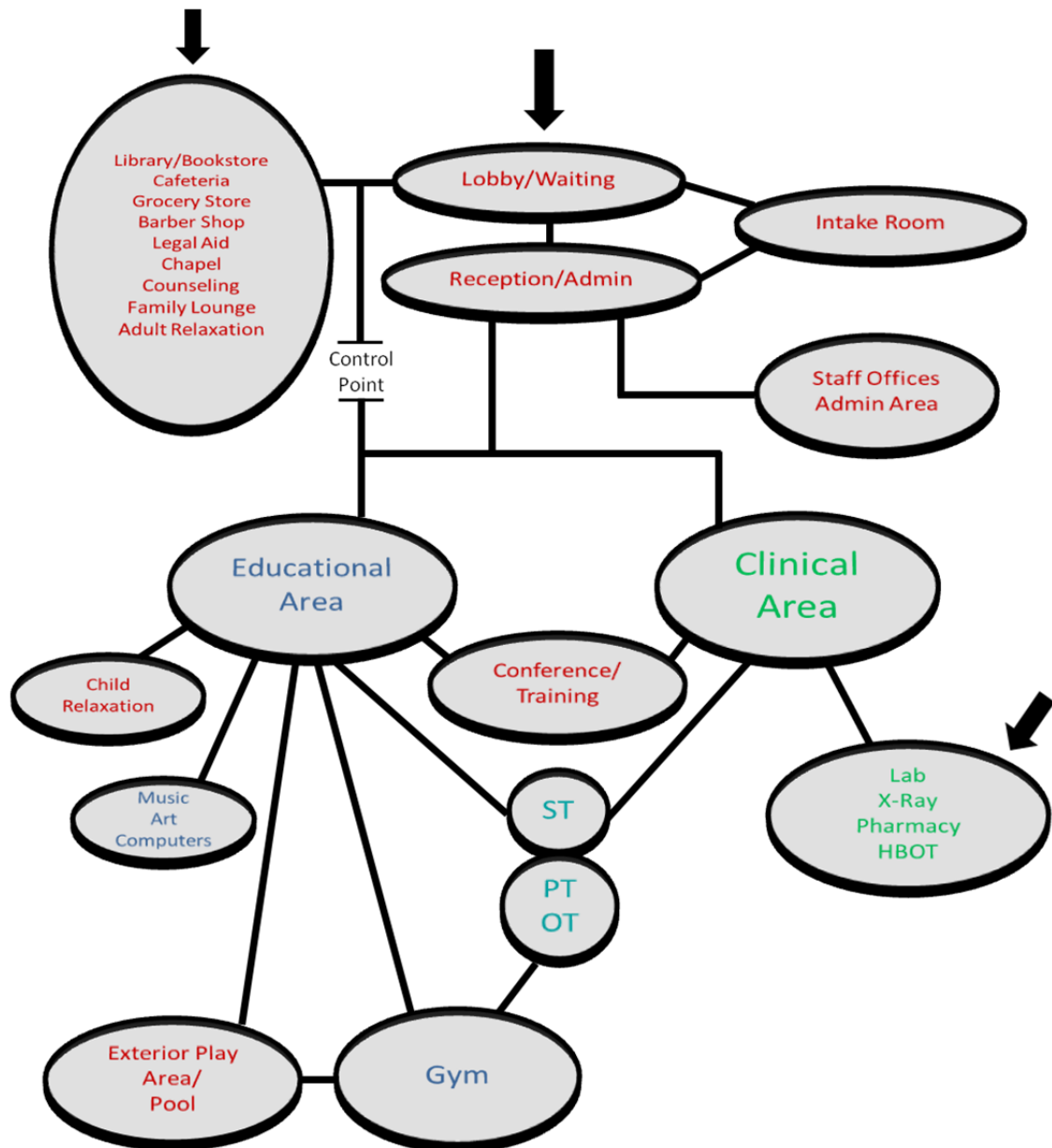


Figure 13: Detailed Functional Relationships



Figure 13 begins to provide some of the logic behind the possibility of secondary entrances. The group of support functions shown in the upper left-hand portion of the diagram are, generally speaking, spaces that can operate on their own. Furthermore, these functions can be accessed without having to cross the control point into the educational/clinical area.

Similarly, the secondary entrance shown into the ancillary services area (clinical laboratory, compounding pharmacy, diagnostic imaging, and hyperbaric oxygen therapy) indicates functions that can stand alone. The primary advantage to this arrangement, as alluded to in a previous chapter, is that these functions can potentially operate as separate businesses that serve the community at large, in order to generate a workload that justifies their inclusion in the programming of the autism facility. For example, the pharmacy could serve anyone, but as a compounding pharmacy that is located adjacent to the autism facility, it provides convenient access (“one-stop shopping”) for the autism customers as well. There could be a storefront entrance for the general public, and an entrance that is connected directly to the autism facility. With additional services included (e.g. lab, x-ray), this area could become its own suite, or “mini-mall,” or even a separate building, functioning in the same way.

In both areas, the business advantage of this arrangement is that the services don’t necessarily have to be operated by the autism center. Rather, the spaces can be occupied by individual businesses. For example, the grocery store could be a Whole Foods location, or the lab could be operated by Diagnostic Laboratory Services, Inc., etc.

In Figure 14, the educational area of the facility is further delineated. The shared relationships with the clinical area are indicated by the dotted line.

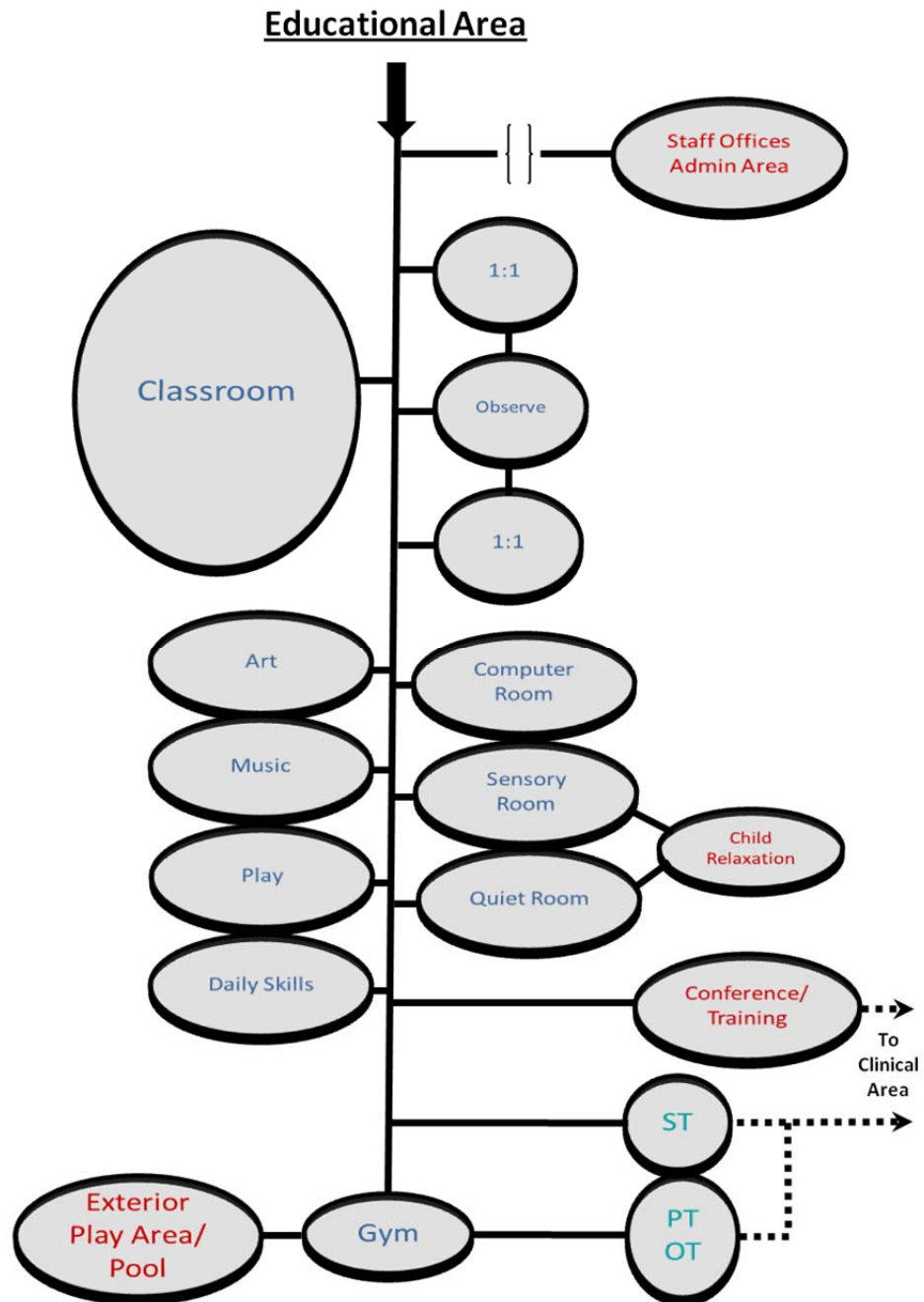
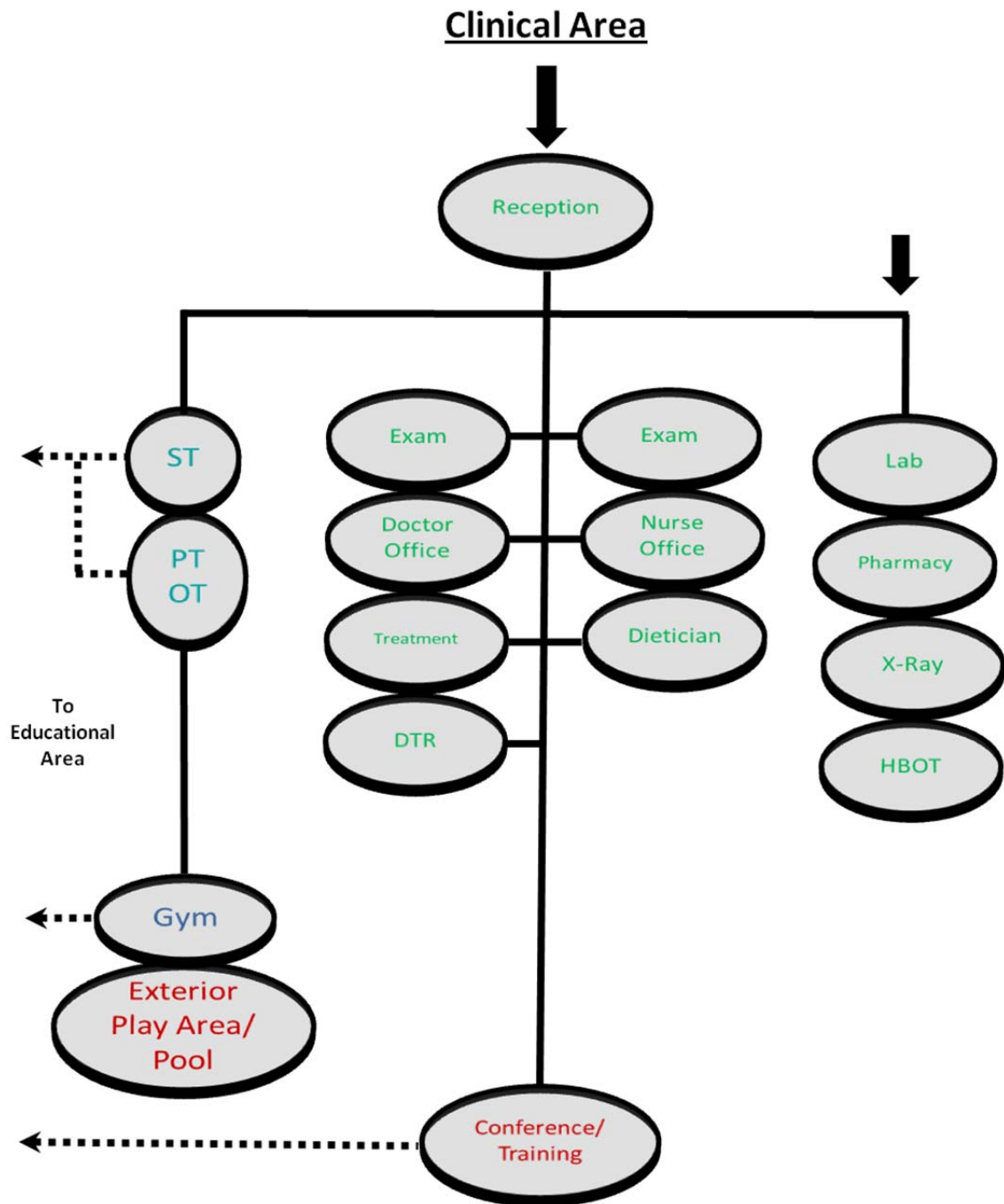


Figure 14: Functional Relationships of Educational Area

Finally, Figure 15 shows the clinical area.



*Figure 15: Functional Relationships of Clinical Area*

### ***Examples from the Excel Spreadsheet Version of the Criteria Guide***

The format of the Planning and Programming Criteria Guide in Excel closely resembles the format of the document presented in this chapter. However, in the spreadsheet, the different departments are presented on separate tabs. In addition, the spreadsheet does not include the functional relationship diagrams. Of course, the primary advantage of the spreadsheet is the embedded formulas, which will calculate many of the space requirements based on student population and staffing input.

Figure 16 below shows the top portion of the “Input” page of the guide.

**Planning and Programming Criteria Guide for Autism Treatment, Resource and Support Centers**

**Step One - Define the Student Population**

Please enter below the projected number of students served in each age group:

0 to 3:	
3 to 5:	
5 to 10:	
Over 10:	
TOTAL:	0

**Step Two - Define the Services that will be Offered**

Please mark all services that are intended to be provided in the facility:

Service	Completion
<b>Educational</b>	
Applied Behavior Analysis	-- Complete "Educational" Tab
Applied Verbal Behavior	-- Complete "Educational" Tab
Pivotal Response Training	-- Complete "Educational" Tab
TEACCH	-- Complete "Educational" Tab
D.I.R. (Floortime)	-- Complete "Educational" Tab
RDI	-- Complete "Educational" Tab
SCERTS	-- Complete "Educational" Tab
Music Therapy	-- Complete "Educational" Tab
Art Classes	-- Complete "Educational" Tab
Computer-Based Programs	-- Complete "Educational" Tab
Daily Living Skills	-- Complete "OT" Tab
<b>Clinical</b>	
Bio-Medical Treatments	-- Complete "Primary Care" Tab

***Figure 16: Screen Shot of Input Tab***

Figure 17 shows the “Educational” tab, and is indicative of the other departmental tabs. As can be seen, the room quantities are all zero. Some of these rooms are calculated based on data from the Input tab (e.g., the number of classrooms is based on the student population), while other room quantities may be generated from previously calculated rooms (e.g. every classroom will generate two toilets). There are some rooms, however, that the quantity must be inserted by the designer. For example, a Music Room will only be generated if the user chooses to include it, whereupon the designer would enter the quantity manually.

ARCH 548 Ping-Pong Guide - Microsoft Excel

Home Insert Page Layout Formulas Data Review View Help

Calibri 12 A A

Clipboard Font Alignment Number Conditional Formatting Styles Cells Editing

Warp Text

Normal Good Neutral Bad

AutoSum Fill Clear Sort & Filter Find & Select

C3 =ROUNDUP(InputB10/15,0)

Educational Spaces

	Room/Function	Quantity	Net Square Feet	Total	Planning Notes
1					
2	✓ Group Classroom (15 Students)	0	750	0	750 SF is standard size classroom for 15 students (50 SF per student). Includes built-in storage units. Larger classrooms may be programmed to accommodate staff training, meetings, etc., but student class size should be limited to 15.
3	Toilets	0	50	0	Two (one male, one female) per group classroom.
4	Individual (one-to-one) Classroom	0	60	0	One per FTE skills trainer.
5	Observation Room	0	60	0	60 SF minimum, for one observer. Add 20 SF for each additional person, based on number of observers desired to accommodate. Place between individual classrooms.
6	Quiet Room	0	100	0	100 SF minimum. One per classroom.
7	Play Room	0	200	0	200 SF minimum. One per center. 15 SF per student (600 SF maximum).
8	Sensory Room	0	100	0	100 SF minimum. One per center. 10 SF per student (300 SF maximum).
9	Music Room	0	400	0	400 SF minimum. 50 SF per student; maximum 15 students per class (750 SF maximum).
10	Music Room Storage	0	100	0	100 SF minimum. 25% of Music Room.
11	Art Room	0	400	0	400 SF minimum. 40 SF per student; maximum 15 students per class (600 SF maximum).
12	Art Room Storage	0	100	0	100 SF minimum. 25% of Art Room.
13	Computer Lab (6 workstations)	0	200	0	200 SF minimum. 35 SF per computer work station.
14	Gymnasium	0	5,075	0	Accommodates standard basketball court.
15	Gymnasium Storage	0	400	0	400 SF minimum.

Input Educational Primary Care OT PT Pharmacy Lab Imaging HBOT Support Summary

Ready

100%

Figure 17: Screen Shot of Educational Tab

Figure 18 shows the “Summary” tab. This is where the net square footage requirements of each department are collected, and departmental net-to-gross factors applied, resulting in the gross square footage for each department. These numbers are then totaled, and the building net-to-gross factor applied. The resulting number represents the programmatic gross square footage of the facility.

Summary				
Department	Net SF	Department Net-to-Gross Factor	Gross SF	Notes
Educational Spaces	0	1.3	0	
Primary Care Clinic	0	1.35	0	
Occupational Therapy	0	1.3	0	
Physical Therapy	0	1.3	0	
Compounding Pharmacy	0	1.25	0	
Clinical Laboratory	0	1.25	0	
Diagnostic Imaging	0	1.5	0	
Hyperbaric Oxygen Therapy	0	1.25	0	
Support Spaces	0	1.4	0	
<b>TOTALS</b>	<b>0</b>		<b>0</b>	
Building Net-to-Gross Factor:		1.3		
Total Gross Square Feet:			0	

Figure 18: Screen Shot of Summary Tab

## **Appendix A**

### **Worksheets from the Excel Spreadsheet Version of the Criteria Guide**

## Planning and Programming Criteria Guide for Autism Treatment, Resource and Support Centers

### Step One – Define the Student Population

Please enter below the projected number of students served in each age group:

0 to 3: \_\_\_\_\_  
 3 to 5: \_\_\_\_\_  
 5 to 10: \_\_\_\_\_  
 Over 10: \_\_\_\_\_  
 TOTAL: 0

### Step Two – Define the Services that will be Offered

Please mark all services that are intended to be provided in the facility:

#### Educational

Applied Behavior Analysis	_____	-- Complete "Educational" Tab
Applied Verbal Behavior	_____	-- Complete "Educational" Tab
Pivotal Response Training	_____	-- Complete "Educational" Tab
TEACCH	_____	-- Complete "Educational" Tab
D.I.R. (Floortime)	_____	-- Complete "Educational" Tab
RDI	_____	-- Complete "Educational" Tab
SCERTS	_____	-- Complete "Educational" Tab
Music Therapy	_____	-- Complete "Educational" Tab
Art Classes	_____	-- Complete "Educational" Tab
Computer-Based Programs	_____	-- Complete "Educational" Tab
Daily Living Skills	_____	-- Complete "OT" Tab

#### Clinical

Bio-Medical Treatments	_____	-- Complete "Primary Care" Tab
Speech Therapy	_____	-- Complete "Primary Care" Tab
Nutritional Counseling	_____	-- Complete "Primary Care" Tab
Dental Treatment	_____	-- Complete "Primary Care" Tab
Occupational Therapy	_____	-- Complete "OT" Tab
Physical Therapy	_____	-- Complete "PT" Tab
Compounding Pharmacy	_____	-- Complete "Pharmacy" Tab

If not provided, is this service available in the local community?

Clinical Laboratory	_____	-- Complete "Lab" Tab
---------------------	-------	-----------------------

If not provided, is this service available in the local community?

Diagnostic Imaging - fMRI or SPECT	_____	-- Complete "Imaging" Tab
------------------------------------	-------	---------------------------

If not provided, is this service available in the local community?

Hyperbaric Oxygen Therapy (HBOT)	_____	-- Complete "HBOT" Tab
----------------------------------	-------	------------------------



### Support Services

Specialized Grocery Store	_____	-- Complete "Support" Tab
<i>If not provided, is this service available in the local community?</i>		
Marriage/Family Counseling	_____	-- Complete "Support" Tab
Financial Counseling	_____	-- Complete "Support" Tab
Legal Services	_____	-- Complete "Support" Tab
Bookstore	_____	-- Complete "Support" Tab
Cafeteria	_____	-- Complete "Support" Tab
Chapel	_____	-- Complete "Support" Tab
Barber Shop	_____	-- Complete "Support" Tab
Additional space for training, support groups, etc.	_____	-- Complete "Support" Tab

### **Step Three – Define the Staffing**

*Based on the projected student population and the services offered, identify the appropriate staffing for the facility. Numbers should represent full-time equivalents (FTEs) for each position:*

Director	_____		
Administrative Personnel	_____		
Behavior Intervention Support Specialist (BISS)	_____		
Skills Trainer	_____		
Music Teacher	_____		
Art Teacher	_____		
Doctor	_____		
Nurse	_____		
Speech Therapist	_____		
Dietician	_____		
Dentist	_____		
Dental Assistant	_____		
Oral Hygienist	_____		
Occupational Therapist	_____		
Physical Therapist	_____		
Pharmacist	_____		
Pharmacy Technician	_____		
Clinical Laboratory Director	_____		
Clinical Laboratory Technician	_____		
Radiology Technician	_____		
HBOT Technician	_____		
Grocery Store Employee	_____		
Family/Marriage Counselor	_____		
Financial Counselor	_____		
Legal Personnel	_____		
Bookstore Employee	_____		
Cafeteria Employee	_____		
Barber	_____		
Other	_____	(Specify:	
TOTAL:	<table border="1"><tr><td>0</td></tr></table>	0	
0			

#### **Step Four – Calculate the Space Requirements**

*Based on the services and staffing selected above, space requirements have been auto-generated on the other tabs of this spreadsheet. These requirements should be reviewed and adjusted as necessary. The final result will be a preliminary room-by-room space program for the facility, that can then be further refined through the design process.*

Educational Spaces					
✓	Room/Function	Quantity	Net Square Feet	Total	Planning Notes
	Group Classroom (15 Students)	0	750	0	750 SF is standard size classroom for 15 students (50 SF per student). Includes built-in storage units. Larger classrooms may be programmed to accommodate staff training, meetings, etc., but student class size should be limited to 15.
	Toilets	0	50	0	Two (one male, one female) per group classroom.
	Individual (one-to-one) Classroom	0	60	0	One per FTE skills trainer.
	Observation Room	0	60	0	60 SF minimum, for one observer. Add 20 SF for each additional person, based on number of observers desired to accommodate. Place between individual classrooms.
	Quiet Room	0	100	0	100 SF minimum. One per classroom.
	Play Room	0	200	0	200 SF minimum. One per center. 15 SF per student (600 SF maximum).
	Sensory Room	0	100	0	100 SF minimum. One per center. 10 SF per student (300 SF maximum).
	Music Room	0	400	0	400 SF minimum. 50 SF per student; maximum 15 students per class (750 SF maximum).
	Music Room Storage	0	100	0	100 SF minimum. 25% of Music Room.
	Art Room	0	400	0	400 SF minimum. 40 SF per student; maximum 15 students per class (600 SF maximum).
	Art Room Storage	0	100	0	100 SF minimum. 25% of Art Room.
	Computer Lab (6 workstations)	0	200	0	200 SF minimum. 35 SF per computer work station.
	Gymnasium	0	5,075	0	Accommodates standard basketball court.
	Gymnasium Storage	0	400	0	400 SF minimum.
	Gymnasium Toilets/Lockers/Showers	0	150	0	150 SF each. One male, one female.
TOTALS		0		0	

Clinical Spaces - Primary Care Clinic					
✓	Room/Function	Quantity	Net Square Feet	Total	Planning Notes
	Waiting Room	0	120	0	120 SF Minimum, if separate clinical waiting is desired. Otherwise, consider using main ATRSC waiting area. Provide 5 seats for each FTE provider (doctor, speech therapist, dietitian, dentist); 16 SF for 95% of seats and 25 SF for 5% of seats.
	Patient Toilet	0	50	0	One male, one female (if clinical waiting is programmed)
	Reception	0	120	0	120 SF Minimum, if separate clinical reception is desired. Otherwise, consider using main ATRSC reception area. Add 60 SF for each employee > 2 seated in this area.
	Patient Records Storage	0	120	0	100 SF Minimum. Divide total # of patient records by 16, then multiply by the shelf factor (.504 for 5 shelf units or .42 for 6 shelf units). For medical and dental records (NOTE: Default formula is based on a 5-shelf unit).
	Screening Room	0	100	0	Not required if screening will be accomplished in Exam Room.
	Exam Room	0	100	0	Two per FTE Doctor.
	Treatment Room	0	175	0	One per clinic.
	Doctor's Office	0	100	0	One per FTE Doctor.
	Nurse's Office	0	100	0	One per FTE Nurse.
	Speech Therapist's Office	0	100	0	One Per FTE Speech Therapist.
	Dietician's Office	0	120	0	One per FTE Dietician.
	Dental Treatment Room, General	0	150	0	One per FTE dentist. Consider two rooms per FTE dentist if workload demand is high.
	Dental Treatment Room, Oral Hygiene	0	150	0	One per FTE Oral Hygienist.
	Dental Sterile Room	0	150	0	Combined room includes decontamination (with sink), instrument wrapping, sterilizing, and clean storage.
	Dentist's Office	0	100	0	One per FTE Dentist.
	Clean Linen/Utility Room	0	120	0	One per clinic.

✓	Room/Function	Quantity	Net Square Feet	Total	Planning Notes
	Soiled Linen/Utility Room	0	100	0	One per clinic.
	Staff Toilet	0	50	0	Consider separate male and female toilets based on staffing.
	Storage Room	0	200	0	200 SF minimum. For equipment, forms/literature, etc.
	Crash Cart Alcove	0	20	0	One per clinic.
	Housekeeping Closet	0	20	0	One per clinic.
	<b>TOTALS</b>	<b>0</b>		<b>0</b>	

Clinical Spaces - Occupational Therapy						
✓	Room/Function	Quantity	Net Square Feet	Total	Planning Notes	
	Treatment Area	0	200	0	200 SF minimum.	
	Daily Living Skills	0	400	0	400 SF minimum. This is a suite that consists of a living room, kitchen, and bathroom. Add 150 SF to include a bedroom.	
	OT Office	0	100	0	1 per FTE Occupational Therapist.	
	Patient Toilet	0	50	0	1 per clinic.	
	Equipment Storage	0	200	0	200 SF minimum.	
	<b>TOTALS</b>	<b>0</b>		<b>0</b>		

Clinical Spaces - Physical Therapy					
✓	Room/Function	Quantity	Net Square Feet	Total	Planning Notes
	PT Exam Room	0	120	0	1 per FTE Physical Therapist.
	Treatment Cubicle	0	110	0	Two cubicles per clinic.
	Exercise Area	0	200	0	200 SF minimum.
	Dressing Room	0	60	0	One per clinic.
	PT Office	0	100	0	One per FTE Physical Therapist.
	Patient Toilet	0	50	0	One per clinic.
	Storage Room	0	200	0	200 SF minimum. For equipment, supplies, linen.
TOTALS		0		0	

Clinical Spaces - Compounding Pharmacy					
✓	Room/Function	Quantity	Net Square Feet	Total	Planning Notes
	Waiting Area	0	200	0	200 SF minimum. Provide 16 SF per seat if more than 12 seats are required. Consider joint waiting area with Clinical Laboratory and Diagnostic Imaging functions.
	Storage/Dispensing Area	0	650	0	One per Pharmacy.
	Manufacturing/Pre-Pack Area	0	80	0	One per Pharmacy.
	Compound Sterile Preparation Area	0	180	0	One per Pharmacy.
	Bulk Storage	0	460	0	One per Pharmacy.
	Pharmacist Office	0	100	0	One per FTE Pharmacist. Also serves as consultation room.
	Staff Toilet	0	50	0	One per Pharmacy.
	Housekeeping Closet	0	20	0	One per Pharmacy.
	<b>TOTALS</b>	<b>0</b>		<b>0</b>	



Clinical Spaces - Clinical Laboratory					
✓	Room/Function	Quantity	Net Square Feet	Total	Planning Notes
	Waiting Area	0	100	0	100 SF minimum. Provide 16 SF per seat if more than 6 seats are required. Consider joint waiting area with Compounding Pharmacy and Diagnostic Imaging functions.
	Reception	0	40	0	40 SF minimum. One per Lab.
	Specimen Collection Toilet (Unisex)	0	50	0	One per Lab.
	Blood Drawing Room	0	200	0	One per Lab. 200 SF minimum for 2 blood draw stations. Add 60 SF for each additional station.
	General Lab Area	0	950	0	Includes chemistry, hematology, and urinalysis. Accommodates 3 lab technicians.
	Storage Room	0	150	0	150 SF minimum. One per Lab.
	Director's Office	0	100	0	One per FTE Laboratory Director.
	Staff Toilet	0	50	0	One per Lab.
	<b>TOTALS</b>	<b>0</b>		<b>0</b>	

Clinical Spaces - Diagnostic Imaging					
✓	Room/Function	Quantity	Net Square Feet	Total	Planning Notes
	Waiting Area	0	100	0	100 SF minimum. Provide 16 SF per seat if more than 6 seats are required. Consider joint waiting area with Compounding Pharmacy and Clinical Laboratory functions.
	Reception	0	40	0	One per department.
	Dressing Room	0	50	0	One per scanning room.
	Patient Litter Holding	0	60	0	One per two scanning rooms.
	Patient Sub-Waiting	0	60	0	One per two scanning rooms.
	Patient Toilet	0	50	0	One per two scanning rooms.
	Patient Preparation	0	120	0	One per two scanning rooms.
	Medication Preparation Station	0	60	0	One per two scanning rooms.
	fMRI Scanning Room	0	500	0	500 SF minimum.
	fMRI Control Room	0	100	0	One per fMRI Scanning room.
	fMRI System Component Room	0	150	0	One per fMRI Scanning room.
	fMRI Gas Storage	0	60	0	One per fMRI suite.
	fMRI Equipment Room	0	280	0	One per fMRI suite.
	SPECT Scanning Room	0	300	0	300 SF minimum.
	SPECT Control Room	0	120	0	One per SPECT Scanning room.

✓	Room/Function	Quantity	Net Square Feet	Total	Planning Notes
	SPECT Independent Display Console	0	120	0	One per SPECT Scanning room.
	Viewing Room	0	150	0	One per two scanning rooms.
	Digital Image Storage	0	120	0	120 SF minimum. One per department.
	Litter/Wheelchair Storage Alcove	0	40	0	One per two scanning rooms.
	Clean Linen Alcove	0	10	0	One per scanning room.
	Soiled Linen	0	80	0	One per department.
	Storage Room	0	100	0	100 SF minimum. One per department.
	Staff Toilet	0	50	0	Consider separate male and female toilets based on staffing.
	Crash Cart Alcove	0	20	0	One per department.
	Housekeeping Closet	0	20	0	One per department.
	<b>TOTALS</b>	<b>0</b>		<b>0</b>	

Clinical Spaces - Hyperbaric Oxygen Therapy					
✓	Room/Function	Quantity	Net Square Feet	Total	Planning Notes
	Waiting Room	0	100	0	Consider joint waiting area with other ancillary functions.
	Dressing Room	0	50	0	One per department.
	Patient Toilet	0	50	0	One per department.
	HBOT Treatment Room	0	200	0	200 SF per chamber.
	Storage Room	0	100	0	One per department.
	<b>TOTALS</b>	<b>0</b>		<b>0</b>	

Support Spaces					
✓	Room/Function	Quantity	Net Square Feet	Total	Planning Notes
	Lobby/Waiting Area	0	200	0	200 SF minimum, if separate waiting areas are provided in clinical spaces. Accommodates 12 seats. If combined with clinical waiting, area should be a minimum of 320 SF. Provide 16 SF for 95% of seats and 25 SF for 5% of seats. Include public toilets.
	Reception/ Administration	0	200	0	200 SF minimum. Add 60 SF for each employee >3 seated in this area.
	Intake Room	0	100	0	One per center.
	Director's Office	0	120	0	One per center.
	Staff Office (Behavioral Specialist, Case Manager, etc.)	0	100	0	One per supervisory staff personnel.
	Administrative Area for Skills Trainers	0	120	0	120 SF minimum. Add 60 SF for each Skills Trainer >2 seated in this area.
	Library/Bookstore	0	400	0	400 SF minimum.
	Cafeteria/Snack Bar (10 seats)	0	400	0	400 SF minimum for a 10-seat food service vendor space, or a "serve only" kitchen (one that dispenses food prepared elsewhere). Add 18 SF per seat for additional seating, and additional space as required by vendor. If a full service kitchen/cafe/teria is desired, consult with a food service specialist. Space is allocated based on the number of meals served (or total student/staff population) and size requirements of the food service equipment.
	Specialized Grocery Store	0	800	0	800 SF minimum. Space leased to a chain vendor can range from 4,000-10,000 SF (e.g. Down to Earth) to 35,000-55,000 (e.g. Whole Foods).
	Parent/Family Lounge	0	400	0	One per center.
	Conference/ Training Room	0	600	0	Minimum one per center, unless function can be accommodated in the Group Classroom(s), if included.

✓	Room/Function	Quantity	Net Square Feet	Total	Planning Notes
	Barber Shop (1 chair)	0	150	0	150 SF minimum. Add 60 SF for each additional chair.
	Family/Marriage Counseling Room	0	150	0	150 SF minimum. One per center.
	Pediatric Counseling Room	0	150	0	150 SF minimum. One per center.
	Financial Counseling Office	0	120	0	120 SF minimum. One per center.
	Legal Aid Office	0	120	0	120 SF minimum. One per center.
	Chapel/Meditation Room	0	120	0	120 SF minimum for a meditation room only. For a full chapel (with altar and chancel), minimum 335 SF for a 30-seat chapel.
	Relaxation Room (Adult)	0	150	0	One per center.
	Relaxation Room (Child)	0	250	0	Minimum one per center. One per classroom is ideal.
	Storage Rooms	0	200	0	200 SF minimum, as required throughout the facility.
	Restroom – Adult	0	60	0	As required throughout facility, per Uniform Plumbing Code.
	Restroom – Children	0	100	0	As required throughout facility, per Uniform Plumbing Code.
	Staff Lounge	0	150	0	150 SF minimum. One per center.
	Communications Room	0	100	0	One per 10,000 GSF of building.
	Housekeeping Closet	0	40	0	One per 10,000 GSF of building (if Compounding Pharmacy is included, provide dedicated closet within secure area of pharmacy).
	<b>TOTALS</b>	<b>0</b>		<b>0</b>	

Exterior Areas (Not included in building square footage calculations)					
	Exterior Play Area	0	0	0	The exterior play area should be maximized based on the available space at the site, but should be a minimum of 3,000 SF.
	Water Play Area/Pool (part of Exterior Area)	0	0	0	Size based on exterior area available at the site.

Summary				
Department	Net SF	Department Net-to-Gross Factor	Gross SF	Notes
Educational Spaces	0	1.3	0	
Primary Care Clinic	0	1.35	0	
Occupational Therapy	0	1.3	0	
Physical Therapy	0	1.3	0	
Compounding Pharmacy	0	1.25	0	
Clinical Laboratory	0	1.25	0	
Diagnostic Imaging	0	1.5	0	
Hyperbaric Oxygen Therapy	0	1.25	0	
Support Spaces	0	1.4	0	
<b>TOTALS</b>	<b>0</b>		<b>0</b>	

Building Net-to-Gross Factor: **1.3**

Total Gross Square Feet: **0**

## ***Conclusions***

The planning and programming criteria document presented in this chapter is intended to serve as a “master” guide for designers. What is ultimately included in any specific project depends on many factors, including budget, availability of land, projected workload, and staffing. For whatever is deemed appropriate, however, it is hoped that this document provides the criteria and guidance needed to design appropriate and functional facilities efficiently.



## **CHAPTER 8: EXAMPLE PROJECT**

The Planning and Programming Criteria Guide presented in Chapter 7 will now be used to develop a sample project for Oahu. This chapter is presented in four primary sections: information regarding the proposed site of the facility; specific planning for the project using the criteria guide; a conceptual design for the proposed facility, based on the results generated from the criteria guide; and finally a cost estimate.

### ***Site Information***

The proposed site for the sample project is a portion of a 30 acre site planned for medical/healthcare use at Koa Ridge in Central Oahu. Koa Ridge is a planned 578 acre mixed use community owned by Castle & Cooke Homes Hawaii, Inc. It is situated along the west side of the H-2 highway, and nestled between Waipio and Mililani, with primary access off of Ka Uka Boulevard. This development includes over 3,100 dwelling units, a mixed use Village Center, and a Town Center. The plan includes a series of neighborhoods with a mix of uses, to include residential, retail, office, live/work, light industrial, and a medical center. This mixture also includes a series of neighborhood parks, a regional active park, churches, and community centers.<sup>1</sup>

Figure 8.1 provides an aerial view of the Koa Ridge development. The medical center site can be seen near the bottom, and is the proposed site for this project.

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<sup>1</sup> Van Meter Williams Pollack LLP, "A Place to Live, Work, Learn, Play and Shop," <http://www.vmwp.com/projects/koa-ridge.php> (accessed April 15, 2011).



Figure 8.1: Koa Ridge Plan<sup>2</sup>

<sup>2</sup> Ibid., "Project Sheet," [http://www.vmw.com/projects/pdfs/koa\\_ridge.pdf](http://www.vmw.com/projects/pdfs/koa_ridge.pdf) (accessed April 15, 2011).

The medical center site is the proposed new home for Wahiawa General Hospital. Architects Hawaii Limited worked with Wahiawa General on a report for the development of the site. Figure 8.2 is a conceptual site plan from that report.

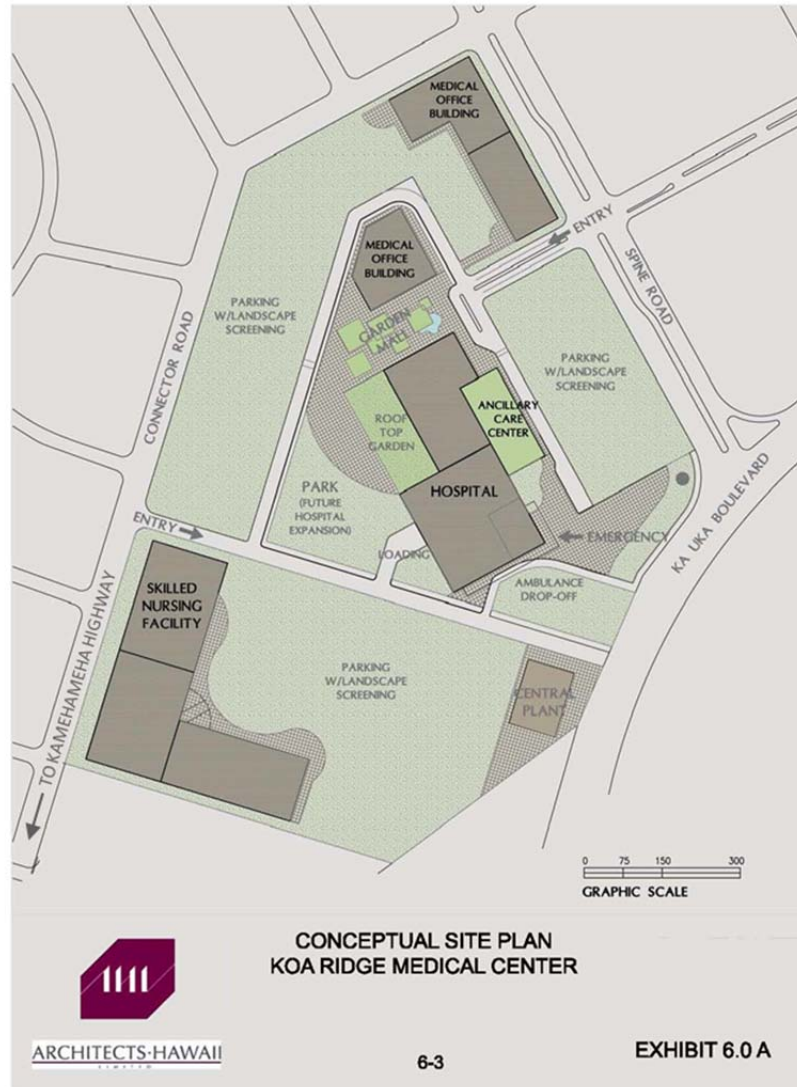
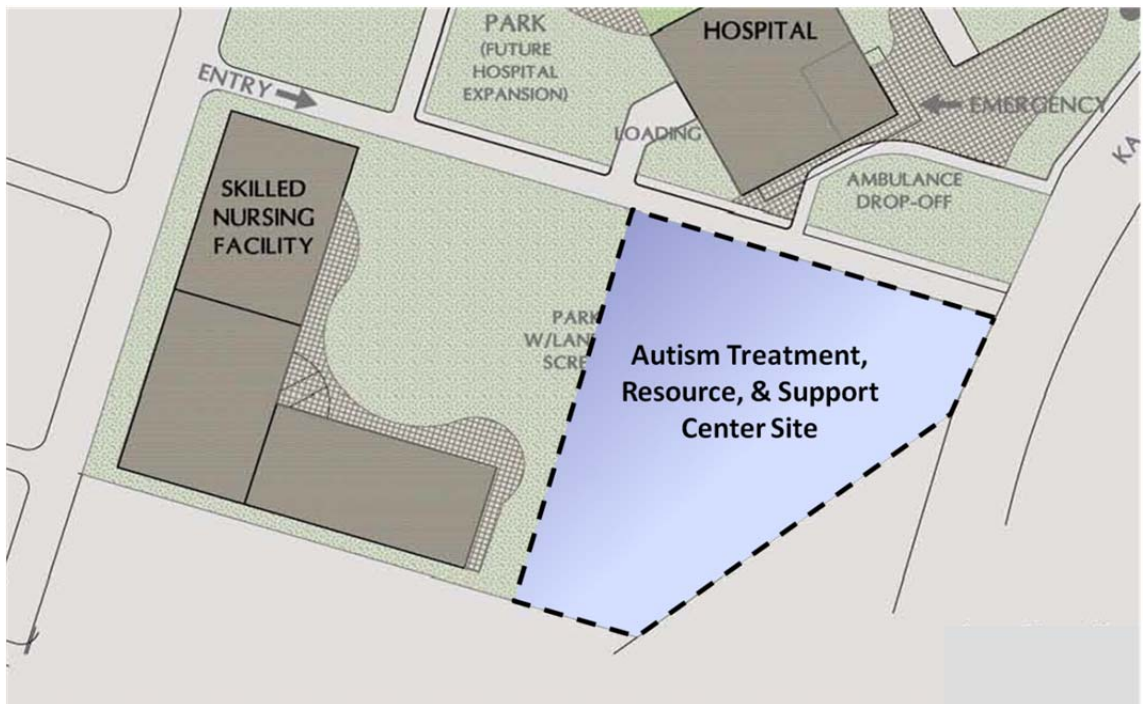


Figure 8.2: Conceptual Site Plan<sup>3</sup>

<sup>3</sup> Architects Hawaii Limited, *Koa Ridge Medical Campus Planning* (Honolulu: Architects Hawaii Limited, September 9, 2008).

As can be seen, the medical campus includes the hospital, an ancillary care center, two medical office buildings, a central plant, and a skilled nursing facility. Due to funding and other issues, there is some doubt as to whether the skilled nursing facility will be included in the project. In addition, the purpose of the master planning study was primarily to show that all of the planned facilities would fit comfortably on the site. The conceptual site plan developed by Architects Hawaii is not meant to be definitive, hence there is flexibility in the placement of the structures. With this in mind, the southeast portion of the site will be developed as the location for the Koa Ridge ATRSC. It is assumed that the central plant, as shown on the conceptual site plan, can be relocated to another area on the site. See figure 8.3.



*Figure 8.3: Proposed Site for the Koa Ridge ATRSC*



**Topography.** The site is currently farmland, with a small degree of elevation change. However, the Koa Ridge development would essentially level the site for the medical center complex. Therefore, a flat site is assumed.

**Site access.** Vehicular access would be from the road that splits the medical center site. This road runs east-west between Ka Uka Boulevard and the proposed Connector Road (which will connect to Kamehameha Highway), offering convenient access to the site from the major thoroughfares, while providing direct access from the secondary road, which will be safer and ease congestion along the main roads.

**Orientation.** Favorable views, the direction of prevailing winds, and the solar pathway will all be considered in the orientation of the ATRSC on the site.

**Views.** Favorable views from the site exist primarily to the west, towards the Waianae Mountains. See figures 8.4 and 8.5.



*Figure 8.4: View Towards the Waianae Mountains*



*Figure 8.5: View Towards the Waianae Mountains*

The view across Ka Uka Boulevard is less desirable, revealing only the commercial activities located there. See figure 8.6.



*Figure 8.6: View Across Ka Uka Boulevard*

*Prevailing winds.* Winds are primarily out of the east and east/northeast throughout the year, blowing from east to west across the site.

*Solar pathway.* Orientation with respect to the solar pathway will maximize day lighting strategies. It may also have the added benefit of reducing the operating costs of the facility.

Figure 8.7 summarizes the site conditions.

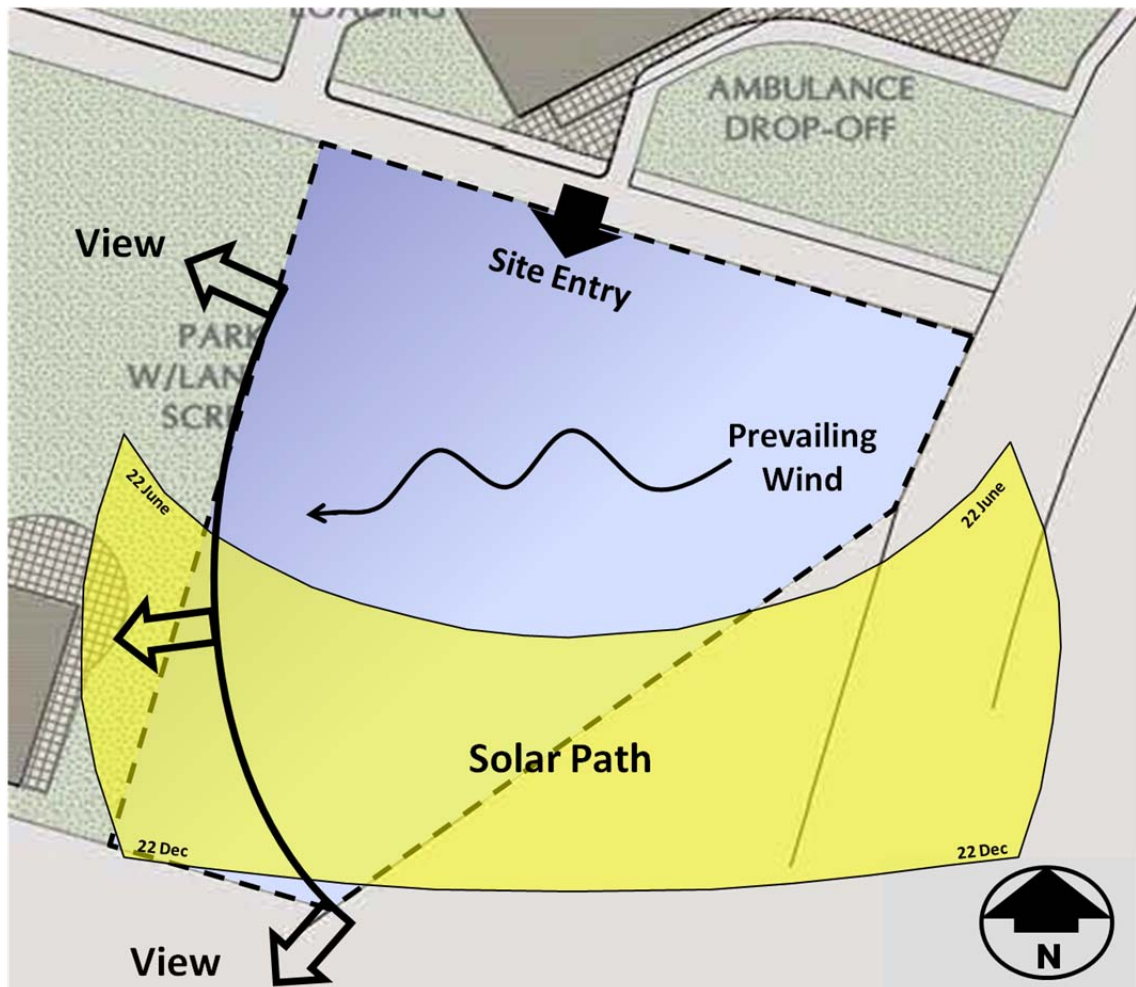


Figure 8.7: Site Considerations

**Landscaping and Parking.** There appears to be enough space available on the site for both an exterior recreation area and adequate parking. Parking could possibly be shared with other facilities on the medical campus.

**Future Expansion.** The Planning and Programming Criteria Guide is based on the concept of 15-student classroom modules. Other functions can potentially be grouped into “modules” as well, such as ancillary services or certain support functions. Even stand-alone functions, such as a gymnasium, could be planned for the future, if initial funding limits the scope of the project. This modular concept will allow for phased construction or future expansion of the ATRSC, based on funds availability, an increase in the number of students served, or a demand for particular services. Therefore, future expansion will be considered when laying out the facility on the site.

**Services available at Wahiawa General Hospital.** For the purpose of informing the planning decisions of the Koa Ridge ATRSC, it was considered that certain services will be available at Wahiawa General Hospital that could be accessed by patrons of the ATRSC. These services include a clinical laboratory, compounding pharmacy, diagnostic imaging, and physical therapy. Using these services at the hospital reduces the footprint, and hence the initial cost, of the ATRSC, and provides access to services that may not have been justified for inclusion in the ATRSC project by the workload of the ATRSC alone.

**Services available in the local community.** The area directly across the Spine Road from the medical center site is planned for commercial retail use. What is



included in this area has yet to be determined, but services such as a retail drug store or possibly a health foods store might be considered. Existing commercial establishments located across Ka Uka Boulevard offer little in terms of direct support to the ATRSC, other than the possibility of parents taking a break or getting some shopping done while their child is in the Center.

### ***Planning and Programming Using the Criteria Guide***

In order to provide a realistic project, it was necessary to identify an “owner,” or end-user of the facility. With this person acting as my client, I could then work through the planning and design process with them to develop a project that would accurately reflect their needs. For this, I again enlisted the assistance of Ms. Anne Lau, Behavior Analyst with the Autism Behavior Consulting Group (ABC Group).

**Step One: Define the Student Population.** During my initial consultation with Ms. Lau, we determined that it would be appropriate to plan the facility to serve the 0-8 age group. This is the age range of students typically seen in autism treatment facilities. The emphasis is on early intervention, and mainstreaming the students into a regular school classroom. Ideally, this would happen no later than the age of eight.

Three primary sources of information were used in an effort to determine the number of students with autism that reside in the catchment area of the proposed site. Each provided specific data, but they all reflected different time periods, so a bit of interpolation is required. These sources are summarized as follows:

- Hawaii Department of Education's "IDEA Part B Data Reports" for 2009. This was the only source of information found that provided breakouts of students in special education by age (ages 3-21). This data indicated that the total number of students aged 3-21 in the "Autism" category was 1,268 in 2009. It also showed 515 students in the "Multiple Disabilities" category, some of which have autism.<sup>4</sup> Information for these categories, in the 3-8 age range, is summarized in Table 8.1.

Disability	Age of Student					
	3	4	5	6	7	8
Autism	65	72	89	114	87	87
Multiple Disabilities	14	20	24	32	35	28

*Table 8.1: Number of Students Ages 3-8 by Disability in Special Education, 2009<sup>5</sup>*

- Hawaii Department of Education's "Performance Report: Performance Period July 2010-December 2010." This report provided the most recent numbers available for students in the DOE, but only showed total numbers. It indicates that the number of special education students in the DOE in Hawaii in the "Autism" category was 1,323 as

<sup>4</sup> Hawaii Department of Education, "IDEA Part B Data Reports," [http://downloads.k12.hi.us/specialeducation/idea\\_part\\_b\\_data\\_reports/09-10/01ChildCountPtB5-2009rev.pdf](http://downloads.k12.hi.us/specialeducation/idea_part_b_data_reports/09-10/01ChildCountPtB5-2009rev.pdf) (accessed February 17, 2011); Thoughtful House Center for Children, "Autism – Statistics, Incidence, Prevalence, Rates," <http://www.thoughtfulhouse.org/tech-labs/disabilities/autism.php?s=HI> (accessed February 17, 2011).

<sup>5</sup> Ibid.

of 1/12/2011. It also shows 542 students in the “Multiple Disabilities” category.<sup>6</sup> Using these numbers, the increase from the 2009 totals was spread proportionately amongst the 3-21 age groups. The data was thus updated as reflected in Table 8.2.

Disability	Age of Student					
	3	4	5	6	7	8
Autism	68	75	93	119	91	91
Multiple Disabilities	15	21	25	34	37	29

*Table 8.2: Estimated Number of Students Ages 3-8 by Disability in Special Education, 2010<sup>7</sup>*

- The State of Hawaii *Report to the Twenty-Fifth Legislature, State of Hawaii, 2009, Pursuant to Act 221, H.B. 2727, H.D. 2, S.D. 1, C.D.1, Hawai'i State Legislature, 2008, Relating to Health Insurance*. This document provided two important pieces of information. First, this report is where it was stated that the total number of children with autism is actually higher than what is listed in the “Autism” disability category, because many students in the “Multiple Disabilities” category have an autism spectrum disorder. Citing 2007 data, it estimated that 200 children in this category have ASD.<sup>8</sup>

<sup>6</sup> Hawaii Department of Education, “Performance Report: Performance Period July 2010-December 2010,” May 2011. [http://165.248.6.166/data/felix\\_archive/report/S03/departments%20of%20education.pdf](http://165.248.6.166/data/felix_archive/report/S03/departments%20of%20education.pdf) (accessed August 22, 2011).

<sup>7</sup> Ibid.

<sup>8</sup> State of Hawaii, *Report to the Twenty-Fifth Legislature, State of Hawaii, 2009, Pursuant to Act 221, H.B. 2727, H.D. 2, S.D. 1, C.D.1, Hawai'i State Legislature, 2008, Relating to Health Insurance* (State of Hawai'i, Department of Health, Health Resources Administration, Family Health Services Division, Children with Special Needs Branch, December 2008), 7.

Using the DOE figures mentioned previously for total number of students with autism, going from 1,268 students in 2009 to 1,323 in 2010 represents a 4% increase in one year. If this increase of 4% per year is applied to 200 students in 2007, the result is 225 students for 2010. 225 is 41.5% of the 542 total students in the “Multiple Disabilities” category in 2010. Therefore, this percentage was applied across the age groups to determine the approximate number of students with autism in the Multiple Disabilities category. The information from Table 8.2 was updated, and is reflected in Table 8.3.

Disability	Age of Student					
	3	4	5	6	7	8
Autism	68	75	93	119	91	91
Multiple Disabilities with Autism	6	9	10	14	15	12

*Table 8.3: Current Estimated Number of Students with Autism Ages 3-8 in Special Education*

Second, this was the only source found that provided the numbers of students with ASD in early intervention (0-3 age range). For the 0-3 age group, the report indicated 132 children with autism, based on 2008 data.<sup>9</sup> Again using the 4% increase per year factor, if this is applied to 132 students in 2008, the result is 143 students for

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<sup>9</sup> Ibid.

2010. This number for the 0-3 age group is then added to the information for the 3-8 age group, and is shown in Table 8.4.

Disability	Age of Student						
	0-3	3	4	5	6	7	8
Autism	143	68	75	93	119	91	91
Multiple Disabilities with Autism		6	9	10	14	15	12
<b>TOTALS</b>	<b>143</b>	<b>76</b>	<b>84</b>	<b>103</b>	<b>133</b>	<b>106</b>	<b>103</b>

*Table 8.4: Current Estimated Number of Students with Autism Ages 0-8 in Hawaii*

At this point, with the total number of students with autism in Hawaii estimated for the 0-8 age range, it is necessary to calculate the numbers for the specific catchment area of the proposed site. The Koa Ridge Medical Center Planning Study by Architect's Hawaii was consulted for this purpose; specifically, Appendix 7.2 – "Koa Ridge Health Campus: Facilities Planning Forecast 2015-2025, accomplished in January 2009 by Cattaneo and Stroud, Inc. This study determined primary service areas based on the location of major hospitals, and listed population numbers for each of these areas. Figure 8.8 shows the primary service area for the Koa Ridge site.

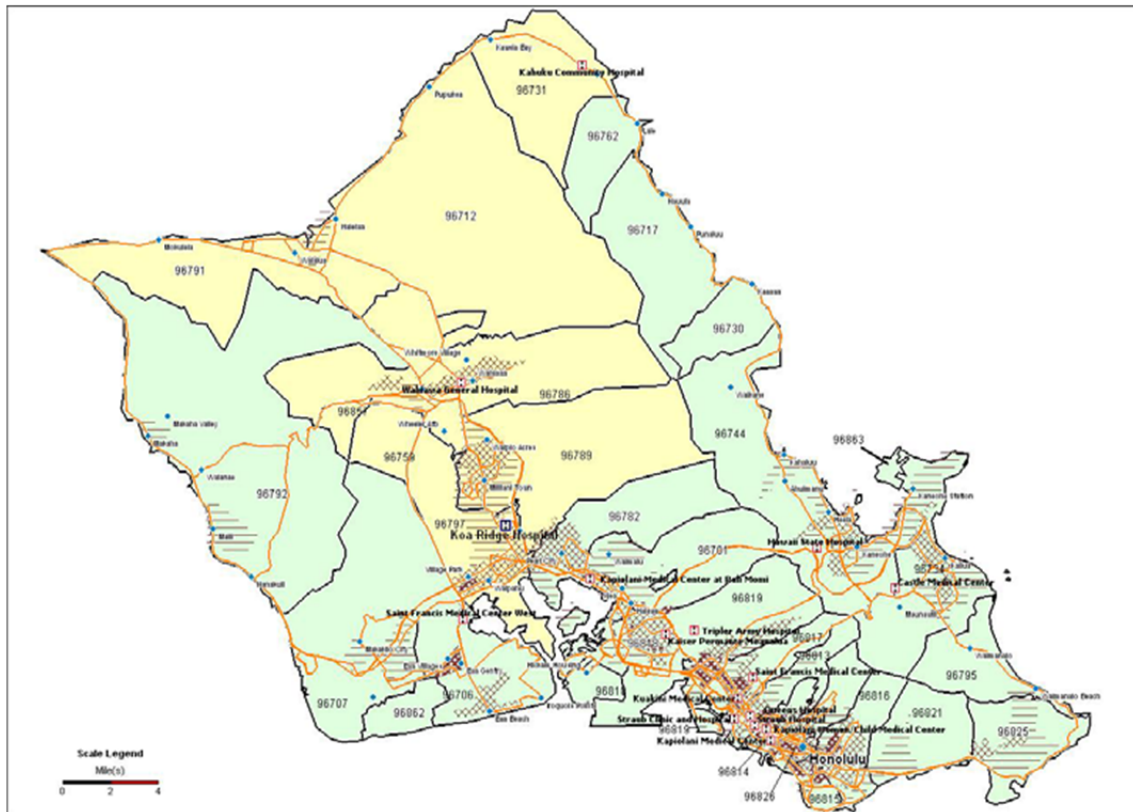


Figure 8.8: Koa Ridge Primary Service Area (in yellow)<sup>10</sup>

In 2010, the total primary service area population was 149,769. The total population for Hawaii was 1,380,689.<sup>11</sup> Therefore, the Koa Ridge service area represents 10.8% of the total population.

Returning to our estimated numbers of students with Autism in Hawaii (from Table 8.4), each age group was multiplied by 10.8% to estimate the number of students in the primary service area with autism. This is shown in Table 8.5.

<sup>10</sup> Architects Hawaii Limited, *Koa Ridge Medical Campus Planning* (Honolulu: Architects Hawaii Limited, September 9, 2008).

<sup>11</sup> Ibid.

Disability	Age of Student						
	0-3	3	4	5	6	7	8
Autism	15	8	9	11	14	11	11

*Table 8.5: Current Estimated Number of Students with Autism Ages 0-8 in the Koa Ridge Primary Service Area*

This gives us an estimated total of 79 students with autism in the primary service (or catchment) area. However, there are still several considerations that must be addressed. First, what would be the utilization rate of the proposed facility (i.e. what percentage of the 79 total would actually enroll at this facility)? This raises several issues:

- The cost of the program will affect enrollment. While some students would be attending under DOH or DOE sponsorship, a number of families would be paying directly out-of-pocket for their child's program.
- The operating hours of the facility will affect enrollment.
- The actual location of the facility will affect enrollment, in terms of how convenient it is for families. For example, families in Kahuku, although part of the primary service area, are less likely to enroll in a facility at Koa Ridge than families in Mililani.

Next, how many students from other primary service areas would enroll at this facility? It is safe to assume that a number of students from the surrounding area, as well as some from across Oahu, would enroll at this facility.

In discussing these factors with Ms. Lau, and based on her experience (particularly regarding enrollment trends at autism treatment facilities on Oahu), we concluded that a utilization rate of 35% would reflect an accurate number of enrollees. Applying this to the 79 total students in the primary service area takes into account potential enrollees from outside the primary service area that would offset those within the primary service area that choose not to enroll. The resulting number is 28 students.

The conceptual model for this project will be based on 15-student group classrooms modules. Therefore, designing for 30 students (two modules) will provide some flexibility, and allow space for additional students based on future growth. The modular concept will allow the facility to be easily expanded if future demand for services warrants it. This reflects an actual utilization rate of 38% (30/79).

The last step before we enter our numbers into the Planning and Programming Criteria Document is to distribute the 30 students appropriately across the age groups. This is done by taking 38% of the numbers shown in Table 8.5. The results are shown in Table 8.6.



Disability	Age of Student						
	0-3	3	4	5	6	7	8
Autism	6	3	4*	4	5	4	4

\*This number was rounded up to bring the total to 30.

*Table 8.6: Estimated Enrollment of Students with Autism Ages 0-8 in the Koa Ridge ATRSC*

We now have the information to complete Step One of the Planning and Programming Criteria Guide:

*Please enter below the projected number of students served in each age group:*

0-3: 6

3-5: 11

5-10: 13

Over 10: N/A

**TOTAL:** 30 *(This number will be used for various calculations)*

**Step Two: Define the Services that will be Offered.** Additional notes have been included to provide points of clarification.

*Please mark all services that are intended to be provided in the facility:*

#### **Educational**

✓ Applied Behavior Analysis *(Complete Section 1 of Step 4)*

✓ Applied Verbal Behavior *(Complete Section 1 of Step 4)*

- ☒ Pivotal Response Training *(Complete Section 1 of Step 4)*
- ☒ TEACCH *(Complete Section 1 of Step 4)*
- ☒ D.I.R. (Floortime) *(Complete Section 1 of Step 4)*
- ☒ RDI *(Complete Section 1 of Step 4)*
- ☒ SCERTS *(Complete Section 1 of Step 4)*
- ☐ Music Therapy *(Complete Section 1 of Step 4)*

(Note: Although music therapy was not included as a service, it was desired to have a combined music/art room.)

- ☒ Art Classes *(Complete Section 1 of Step 4)*
- ☐ Computer-Based Programs *(Complete Section 1 of Step 4)*

(NOTE: Computer-based programs will be incorporated into each child's curriculum, but it was not desired to have a separate computer room.)

- ☒ Daily Living Skills *(Complete Section 2.B of Step 4)*

## **Clinical**

- ☒ Bio-Medical Treatments *(Complete Section 2.A of Step 4)*
- ☒ Speech Therapy *(Complete Section 2.A of Step 4)*
- ☒ Nutritional Counseling *(Complete Section 2.A of Step 4)*
- ☐ Dental Treatment *(Complete Section 2.A of Step 4)*
- ☒ Occupational Therapy *(Complete Section 2.B of Step 4)*
- ☒ Physical Therapy *(Complete Section 2.C of Step 4)*

(NOTE: Although physical therapy will available at Wahiawa General Hospital, a small PT section was desired in this facility as well.)

\_\_\_\_\_ Compounding Pharmacy *(Complete Section 2.D of Step 4)*

*(If not provided, is this service available in the local community? Yes / ~~No~~ )*

\_\_\_\_\_ Clinical Laboratory *(Complete Section 2.E of Step 4)*

*(If not provided, is this service available in the local community? Yes / ~~No~~ )*

\_\_\_\_\_ Diagnostic Imaging – fMRI or SPECT *(Complete Section 2.F of Step 4)*

*(If not provided, is this service available in the local community? Yes / ~~No~~ )*

✓ \_\_\_\_\_ Hyperbaric Oxygen Therapy (HBOT) *(Complete Section 2.G of Step 4)*

### **Support Services**

✓ \_\_\_\_\_ Specialized Grocery Store *(Complete Section 3 of Step 4)*

*(If not provided, is this service available in the local community? Yes / ~~No~~ )*

✓ \_\_\_\_\_ Marriage/Family Counseling *(Complete Section 3 of Step 4)*

✓ \_\_\_\_\_ Financial Counseling *(Complete Section 3 of Step 4)*

✓ \_\_\_\_\_ Legal Services *(Complete Section 3 of Step 4)*

\_\_\_\_\_ Bookstore *(Complete Section 3 of Step 4)*

\_\_\_\_\_ Cafeteria *(Complete Section 3 of Step 4)*

\_\_\_\_\_ Chapel *(Complete Section 3 of Step 4)*

\_\_\_\_\_ Barber Shop *(Complete Section 3 of Step 4)*

✓ \_\_\_\_\_ Additional space for training, support groups, etc. *(Complete Section 3 of Step 4)*

*Can any of the above listed services be provided through co-located facilities that are operated by separate entities (e.g. pharmacy, lab, imaging, grocery store, barber shop, counseling, legal services, etc.)? Yes – Ancillary services will be available on campus at Wahiawa General Hospital (pharmacy, lab, diagnostic imaging).*

### **Step Three – Define the Staffing.**

*Based on the projected student population and the services offered, identify the appropriate staffing for the facility. Numbers should represent full-time equivalents (FTEs) for each position:*

<u>1</u>	Director
<u>2</u>	Administrative Personnel
<u>3</u>	Behavior Intervention Support Specialist (BISS)
<u>2</u>	Special Education Teacher
<u>33</u>	Skills Trainer (NOTE: Three are substitutes)
<u></u>	Music Teacher
<u>1</u>	Art Teacher
<u>0.5</u>	Doctor
<u>1</u>	Nurse
<u>0.33</u>	Speech Therapist
<u>0.5</u>	Dietician
<u></u>	Dentist
<u></u>	Dental Assistant

_____	Oral Hygienist
<u>0.33</u>	Occupational Therapist
<u>0.33</u>	Physical Therapist
_____	Pharmacist
_____	Pharmacy Technician
_____	Clinical Laboratory Director
_____	Clinical Laboratory Technician
_____	Radiology Technician
<u>1</u>	HBOT Technician
<u>3</u>	Grocery Store Employee
<u>1</u>	Family/Marriage Counselor
_____	Financial Counselor
<u>1</u>	Legal Personnel
_____	Bookstore Employee
_____	Cafeteria Employee
_____	Barber
_____	Other (Specify: _____)

#### **Step Four – Calculate the Space Requirements.**

*Based on the services and staffing selected above, check the rooms/functions that you wish to be included in the facility, and then apply the corresponding criteria. This will*

result in a preliminary room-by-room space program for the facility, that can then be further refined through the design process.

### 1. Educational Spaces

✓	Room/Function	Net Square Feet	Qty.	Planning Notes
✓	Group Classroom (15 Students)	750	2	
✓	Toilets	50	4	
✓	Individual (one-to-one) Classroom	60	30	
✓	Observation Room	60 140	4 2	Four rooms that can accommodate two observers each; two rooms that can accommodate five observers.
✓	Quiet Room	100	2	
✓	Play Room	450	1	
✓	Sensory Room	300	1	
✓	Music Room	750	1	Combined Music/Art Room.
✓	Music Room Storage	188	1	
	Art Room	600		
	Art Room Storage	150		
	Computer Lab (6 workstations)	200		
	Gymnasium	5,075		
	Gymnasium Storage	400		
	Gymnasium Toilets/Lockers/Showers	150		
	Daily Living Skills	400		Included in Occupational Therapy Clinic space.
	<b>TOTAL Net SF</b>	<b>5,908</b>		

## 2. Clinical Spaces

### A. Primary Care Clinic

✓	Room/Function	Net Square Feet	Qty.	Planning Notes
	Waiting Room	120		Will use combined Waiting Room for entire facility.
	Patient Toilet	50		
	Reception	120		Will used combined Reception for entire facility.
	Patient Records Storage	120		
	Screening Room	100		
✓	Exam Room	100	2	
	Treatment Room	175		
✓	Doctor's Office	100	1	One dedicated office for part-time doctor(s).
✓	Nurse's Office	100	1	
✓	Speech Therapist's Office	100	1	
✓	Dietician's Office	120	1	
	Dental Treatment Room, General	150		
	Dental Treatment Room, Oral Hygiene	150		
	Dental Sterile Room	150		
	Dentist's Office	100		
	Clean Linen/Utility Room	120		
	Soiled Linen/Utility Room	100		
✓	Staff Toilet	50	1	
✓	Storage Room	200	1	
	Crash Cart Alcove	20		

	Housekeeping Closet	20		Will be captured in Support section for entire facility.
	<b>TOTAL Net SF</b>	<b>870</b>		

*B. Occupational Therapy*

✓	Room/Function	Net Square Feet	Qty.	Planning Notes
✓	Treatment Area	200	1	
✓	Daily Living Skills	400	1	
✓	OT Office	100	1	
✓	Patient Toilet	50	1	
✓	Equipment Storage	200	1	
	<b>TOTAL Net SF</b>	<b>950</b>		

*C. Physical Therapy*

✓	Room/Function	Net Square Feet	Qty.	Planning Notes
✓	PT Exam Room	120	1	
	Treatment Cubicle	110		
✓	Exercise Area	200	1	
	Dressing Room	60		
✓	PT Office	100	1	
	Patient Toilet	50		Will share toilets with adjacent departments.
✓	Storage Room	200	1	
	<b>TOTAL Net SF</b>	<b>620</b>		



D. Compounding Pharmacy: Not used.

E. Clinical Laboratory: Not used.

F. Diagnostic Imaging: Not used.

G. Hyperbaric Oxygen Therapy

✓	Room/Function	Net Square Feet	Qty.	Planning Notes
	Waiting Room	100		Will used combined Waiting Room for entire facility.
✓	Dressing Room	50	1	
✓	Patient Toilet	50	1	
✓	HBOT Treatment Room	200	1	
✓	Storage Room	100	1	
	<b>TOTAL Net SF</b>	<b>600</b>		

### 3. Support Spaces

✓	Room/Function	Net Square Feet	Qty.	Planning Notes
✓	Lobby/Waiting Area	320	1	Combined Lobby/Waiting Area to support entire facility. 20 seats.
✓	Reception/ Administration	200	1	Combined Reception/Administration area to support entire facility.
✓	Intake Room	100	1	
✓	Director's Office	120	1	
✓	Staff Office (Behavioral Specialists, SPED Teacher, etc.)	100	5	
✓	Administrative Area for Skills Trainers	120	1	Common administrative area. Each skills trainer will have their own space in the one-to-one classrooms.

	Library/Bookstore	400		
	Cafeteria/Snack Bar (10 seats)	400		
✓	Specialized Grocery Store	800	1	
✓	Parent/Family Lounge	400	1	
✓	Conference/Training Room	600	1	
	Barber Shop (1 chair)	150		
✓	Family/Marriage Counseling Room	150	1	
✓	Pediatric Counseling Room	150	1	
✓	Financial Counseling Office	120	1	
✓	Legal Aid Office	120	1	
	Chapel/Meditation Room	120		
	Relaxation Room (Adult)	150		Parent Lounge used for this function.
	Relaxation Room (Child)	250		Quiet Rooms used for this function.
✓	Storage Rooms	200	3	
✓	Restroom – Adult	200	4	2 female ( 2 water closets, 2 lavatories); 2 male (1 water closet, 1 urinal, 2 lavatories).
✓	Restroom - Children	100	4	2 female ( 1 water closet, 1 lavatory); 2 male (1 water closet, 1 urinal, 1 lavatory).
✓	Staff Lounge	150	1	
✓	Communications Room	100	3	
✓	Housekeeping Closet	40	3	
	<b>TOTAL Net SF</b>	<b>6,070</b>		

Exterior Areas (Not included in building square footage calculations)				
✓	Exterior Play Area	*	1	The exterior play area should be maximized based on the available space at the site, but should be a minimum of 3,000 SF.
✓	Water Play Area/Pool (part of Exterior Area)	*	1	Size based on exterior area available at the site.

#### 4. Net-to-Gross Conversion

Net-to-gross conversion factors are provided for each department. The resulting gross areas for each department should be added together, and then the building net-to-gross factor applied to determine the overall gross area of the building.

Department	Net SF	Net-to-Gross Ratio	Gross SF
Educational Area	5,908	1.3	7,680
Primary Care Clinic	870	1.35	1,175
Occupational Therapy	950	1.3	1,235
Physical Therapy	620	1.3	806
Hyperbaric Oxygen Therapy	600	1.25	750
Support Spaces	6,070	1.4	8,498
<b>TOTALS</b>	<b>15,018</b>		<b>20,143</b>

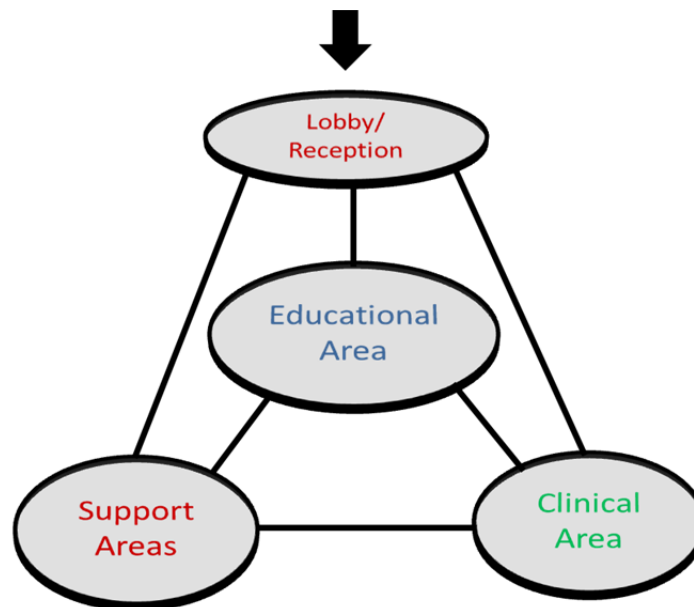
Building	Department Gross SF	Net-to-Gross Ratio	Building Gross SF
Koa Ridge ATRSC	20,143	1.3	<b>26,186</b>

We now have a room-by-room space program for the conceptual design of a 26,186 square foot Autism Treatment, Resource, and Support Center at Koa Ridge.

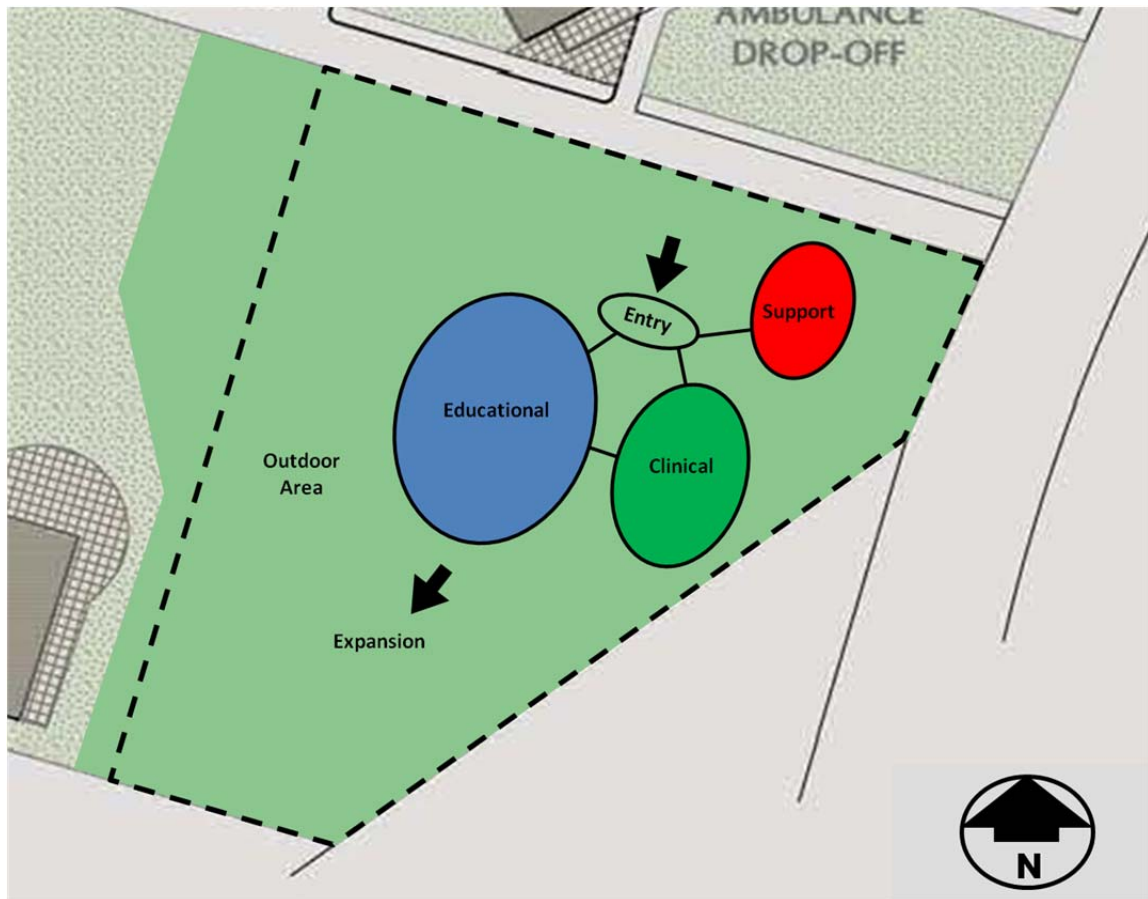
### ***Conceptual Design***

The intent for the Koa Ridge ATRSC is to develop a schematic design that will not only show the usefulness of the Planning and Programming Criteria Guide, but will also provide the initial concepts of a facility that could be further developed and eventually constructed at the Koa Ridge site. The goal is a set of presentation drawings that convey the overall concept of the facility.

The initial concept for the layout of the facility was developed by applying the the overall functional relationship diagrams presented in Chapter 7 to the proposed site for the ATRSC. See figures 8.9 and 8.10.



*Figure 8.9: Basic Functional Relationships*



*Figure 8.10: Basic Functional Relationships applied to the Koa Ridge Site*

The irregular shape of the site, with its widest point along the northern boundary and becoming more narrow towards the southern boundary, partially dictated the building layout. Another factor was the likelihood of shared parking with the proposed long-term care facility to the west. When compared to the expanded functional relationships diagram presented in Chapter 7 (see figure 8.11), it can be seen that the main “Support” area has flipped to the right side of the main entry. Otherwise, the basic functional relationships remain intact.

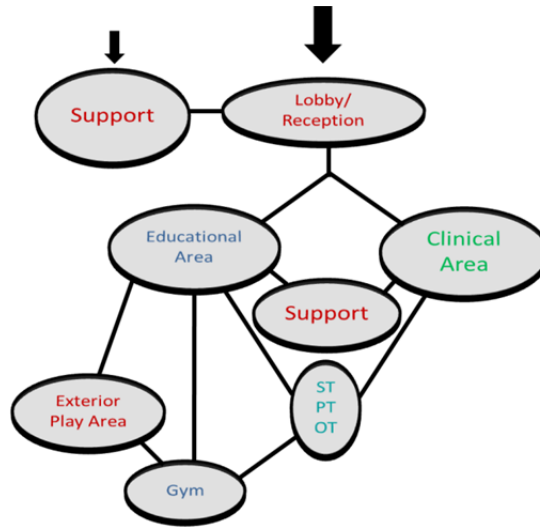


Figure 8.11: Expanded Functional Relationships

The floor plan was then laid out based upon the detailed functional relationships diagram and individual department diagrams from Chapter 7. See figure 8.12.

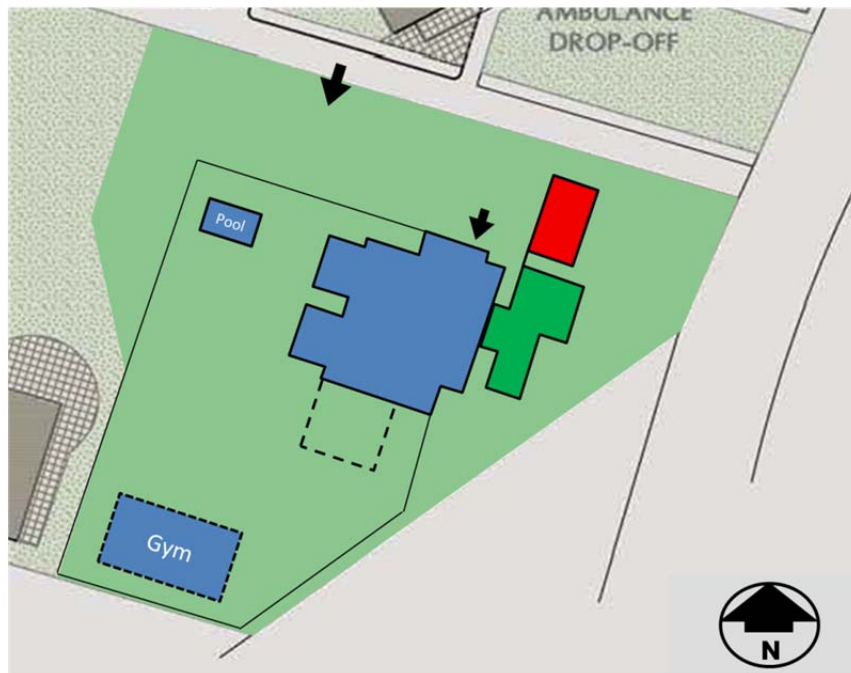


Figure 8.12: Schematic Site Plan

This layout provides ample space for the exterior play area, and also for future expansion of the facility. As mentioned previously, the educational area is based on two 15-student classroom modules, and figure 8.12 shows the area where a third module could be easily added. And although a gym is not included in the Koa Ridge ATRSC program, it is shown on the schematic site plan to indicate that it could be built in the future.

The facility design, while adhering to the functional relationship diagrams, is also meant to provide a positive environment for students, parents, and staff alike. Natural light is introduced through a series of courtyards, as well as clerestories over the two classrooms. The courtyards also provide a break area for both students and staff. Rounded corners are introduced in the main corridor to the educational area to provide a sense of relief from the rigidity of the floor plan, and also for safety purposes. “Nodes” are introduced in the form of trellis-covered areas at the facility entry points.

A sense of “openness” is provided not only from the placement of the courtyards, but also through the use of wide corridors. The corridors in the educational area are 8’ wide, while all other corridors are 6’ wide. In addition, the corridor layout is meant to accommodate future expansion of the facility by simply extending the corridors along their existing axis.

An additional feature of this design, driven by budgeting concerns, is the potential to construct the facility in phases. These phases are naturally delineated by the grouping of the functions. For example, the initial phase could include the

educational area, including the central block of administrative and support functions. It could even be built with only one classroom initially, and the second classroom added later. As resources become available, the clinical area could be added on the east side of the facility. And finally, the building that houses the support area functions could be built as the final phase of the project. It would obviously be ideal for the entire facility to be constructed at one time, but given the fiscal constraints faced by most organizations, the ability to logically phase the construction over several budget cycles could assist these entities in meeting long-term goals.

The staggering cost of autism treatment was mentioned earlier in this report. Part of this cost is obviously overhead that many organizations pay for rent, utilities, etc. In that regard, another goal of ATRSCs would be to reduce operating costs as much as possible. Although it is beyond the scope of this report, it is intended that any detailed design of an ATRSC would incorporate all viable alternative energy sources (most notable for this project would be solar power, via photovoltaic panels and solar thermal systems), with the intent that the savings in operating costs be passed along to the customer—the parents that are funding their child’s treatments.

The set of drawings on the following pages is intended as a schematic design only. However, it is hoped that the spirit of the purpose of the building, as well as its relationship to the site, have been captured appropriately.



Parking to tie-in  
with Long-Term  
Care Center Lot

← Delivery  
Area for  
Grocery Store

← Parent  
Break  
Area

Pool →

Playhouse  
Sandbox →  
Swing Set

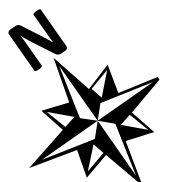
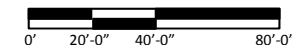
← Staff  
Break  
Area

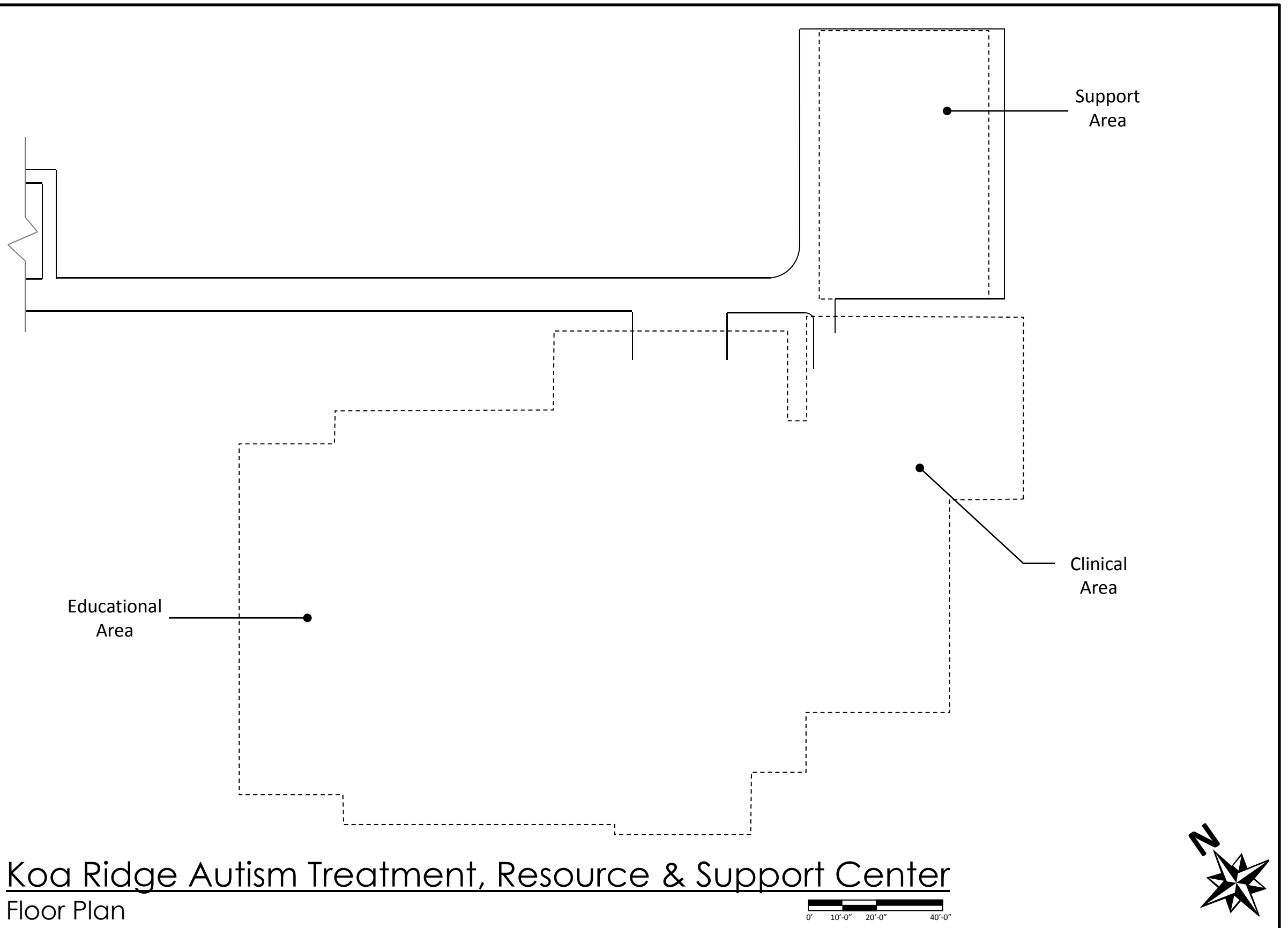
← Covered  
Picnic  
Pavilion

Basketball  
Court →

# Koa Ridge Autism Treatment, Resource & Support Center

## Site Plan







# Koa Ridge Autism Treatment, Resource & Support Center

Overhead View w/o Roof

0' 10'-0" 20'-0" 40'-0"





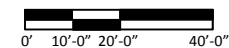
Northeast Elevation



Southeast Elevation

Koa Ridge Autism Treatment, Resource & Support Center

Elevations







Koa Ridge Autism Treatment, Resource & Support Center  
Entrance View





Koa Ridge Autism Treatment, Resource & Support Center

Aerial View of Main Facade





Koa Ridge Autism Treatment, Resource & Support Center  
Aerial View Looking West





Koa Ridge Autism Treatment, Resource & Support Center  
Recreation Yard





Koa Ridge Autism Treatment, Resource & Support Center  
Interior View (Roof Removed)





Koa Ridge Autism Treatment, Resource & Support Center  
Aerial View Looking South

As designed, the Koa Ridge ATRSC totals 28,455 square feet. This represents a 8.7% increase over the originally programmed space of 26,186 square feet. This can be attributed to an increase in the size of several spaces (such as the main waiting room and the grocery store) to accommodate a functional layout; large mechanical/electrical rooms (to support future expansion of the facility); and generous circulation space. If funding for the project was tied to an initial budget based on the programmed area of 26,186 SF, part of the design process would be to trim scope or develop efficiencies in the design to bring the square footage down to the programmed space. For the Koa Ridge ATRSC, however, the primary concern was to provide a functional plan that responded to the client's needs, with the resulting cost being based on that product. At any rate, a difference of + or – ten percent from the programmed scope is within a reasonable range, and confirms the usefulness of the Planning and Programming Criteria Guide.

The following is a brief description of the various components of the design.

**Civil.** Entry to the site is placed to avoid interfering with the possible emergency entrance to the Hospital across the street, as shown on the Architects Hawaii site plan. This also accommodates a drive-through drop-off area at the main entrance. The paved area extends around to the rear of the support building, in order to provide a service/delivery area to the grocery store. Parking is arranged to tie in to the lot for the long-term care facility to the west, in order to maximize the number of spaces available.



The outdoor recreation area is completely enclosed by a fence to maintain security for the students. This large area features a pool, swing set, sandbox, basketball court, and a large covered pavilion for eating lunch or other activities.

**Architectural.** In addition to the features mentioned earlier (natural lighting, the courtyards, the use of nodes, a sense of openness), the facility is meant to blend with the site and reflect a local feeling that respects the sense of place. The single-story structure fits with the residential scale of the Koa Ridge development, while the double-pitched roof provides a predominant feature that is sensitive to the local context.

The interior design consists of warm, soft pastels, and each classroom module employs a different color scheme to add a sense of identification. In addition, the flooring in the educational area corridors is different than the rest of the facility, to provide a visual cue to the students on where they need to be. The colors used for the flooring and corridor walls are meant to enhance the wayfinding in the facility. Offices, the Observation Rooms, and the Quiet Rooms are finished with carpet, while other rooms are outfitted with vinyl tile. Ceilings are primarily acoustical tile.

**Structural.** In keeping with the residential scale of the facility, a simple metal stud-wall framing system is employed, with wood rafters to support the roof. The foundation would be a slab-on-grade.

**Mechanical.** Ample space is provided in the mechanical rooms for chillers and air handling units. A dual-duct variable-air-volume system would be employed, with ductwork running through the attic space. This system should employ a continuous air-

flow mode when the facility is occupied, to avoid on-off cycles. An economizer mode can be utilized during non-business hours. The attic space is insulated to minimize heat gain and conserve energy.

**Electrical.** Indirect fluorescent lighting is employed so that the lamps are not visible to the students, but the energy savings are still realized. Dimmer switches are used throughout the educational area so the lighting levels can be adjusted.

### ***Cost Estimate***

A basic square foot take-off is provided here as appropriate to the stage of design development. As a schematic design, the materials and systems have not been developed to a point to accurately prepare a more detailed estimate.

Project Location: Koa Ridge, Oahu, Hawaii  
Area Cost Factor: 2.1  
Baseline Cost for Educational Area: \$176/SF  
Baseline Cost for Clinical Area: \$286/SF  
Baseline Cost for Support Area: \$195/SF  
Overhead/Contingency: 10%

$(\text{Gross SF}) \times (\text{Cost/SF}) \times (\text{Area Cost Factor}) \times (\text{OH/Contingency}) = \text{Project Cost Estimate}$

#### Educational Area:

$(21,613) \times (\$176) \times (2.1) \times (1.10) = \$8,786,981$

#### Clinical Area:

$(4,335) \times (\$286) \times (2.1) \times (1.10) = \$2,863,961$

#### Support Area:

$(2,507) \times (\$195) \times (2.1) \times (1.10) = \$1,129,278$

**Total (28,455 SF) =**  $(\$8,786,981) + (\$2,863,961) + (\$1,129,278) = \mathbf{\$12,780,220}$  (\$449/SF)

## ***Conclusions***

The use of the Planning and Programming Criteria Guide to develop the ATRSC for Koa Ridge resulted in a planning document that met all of the end-user's requirements, and greatly facilitated the early stages of the design process. The biggest problem encountered was the lack of specific demographic data on the autism population of Oahu, as well as the primary service area, which resulted in the interpolation of various sets of data to come up with a bottom-line number.

Several spaces were adjusted during the design, and this is a normal occurrence during the design process when applying generic criteria to a specific project. For example, because the parental support functions were placed in a separate building, the housekeeping closet programmed for that building was changed to a toilet. Other adjustments were primarily to room sizes, making them slightly larger or smaller to accommodate the layout.

Having an actual site identified at the Koa Ridge development makes the project more realistic, and raises the possibility that such a facility could actually be included in the plans for the medical center, or at least accommodated on the medical center site. The fact that the design lends itself to being constructed in modules, or phases, makes its potential inclusion even more feasible.

It is hoped that the conceptual design for the Koa Ridge ATRSC presented in this chapter might plant the seed for the eventual realization of such a facility on Oahu.

## **CHAPTER 9: CONCLUSION**

This report has used a variety of research methods to state the case for comprehensive autism treatment, resource, and support centers (ATRSCs). In addition, the research has been used to support the development of a programming and planning criteria document for the design of these facilities. When taken in its entirety, the document sets forth the logical argument that the establishment of these facilities will provide a more holistic, family-centered approach to the treatment of autism, which will in turn lead to better outcomes for both patients and their families. That is the ultimate goal.

It seems fairly evident that with the ever-increasing prevalence of autism, the demand for autism-related facilities will increase as well, and that of course will lead to an increased demand for design services. A resource document that outlines the criteria for the planning and programming of these facilities is clearly in order, and it is hoped that the product presented in this report will fill that void.

The Planning and Programming Criteria Guide proved to be a useful tool in the development of the example project at Koa Ridge. Using it as a guide when meeting with the client greatly facilitated the planning process, ensuring that all possible functions were considered and no spaces overlooked. The primary shortcoming of the document is perhaps that it is in an Excel spreadsheet format. The product would likely be more user-friendly, and more powerful, if it were adapted to a database format. The

fact that that it is not is attributable to the author's lack of experience with database creation and manipulation, rather than any interface issues with data itself.

That said, there are several points that should be kept in mind regarding the Planning and Programming Criteria Guide, as well as the schematic design for the project at Koa Ridge. The Guide proved to be a useful tool for me, but beyond my use of it for the Koa Ridge project, it remains untested. This begs the question of whether the tool would be useful for others, particularly those without experience with autism or in the design of medical or educational facilities. The bubble diagrams in the Guide are meant to provide the user with the basic functional relationships, but if the bubble diagrams were not included, would the Guide lend itself to an intuitive design process? Obviously, familiarizing oneself with the building type is a prerequisite for any design, and the Guide is meant to provide initial planning and programming criteria only. But as the tool is utilized by different users for different projects, it could be fine-tuned and improved to be a product that is truly useful to the profession.

It should also be pointed out that the input provided by my "client," Anne Lau, was invaluable, not only for the design of the Koa Ridge project itself, but also in identifying shortcomings in the Guide that were corrected and incorporated into the final product. This underscores the fact that the design process is a team effort, and while the Planning and Programming Criteria Guide greatly facilitated the early stages of design, it is simply a tool, and there is no substitute for having experts in the field (in this case, the field of autism) involved in the design process.



Also of note is that while the Koa Ridge project is essentially a school and clinic, combined with some support functions, the focus in the design of any Autism Treatment, Resource and Support Center should be on the unique aspects that make it a facility specifically for autism. Features such as the enclosed playground area; the use of warm, soft, pastel colors that are non-stimulating, yet still provide a colorful, cheerful atmosphere that assists in wayfinding; the placement of windows to admit natural light yet avoid distracting views; the inclusion of “Quiet Rooms” – these are all meant to address specific concerns of students on the autism spectrum. But it should be kept in mind that the Koa Ridge ATRSC is not a prototype. Rather, it is a proposed solution to a specific design problem on a specific site, and each individual project will have its own set of issues that must be addressed. The designer has the dual challenge of addressing the design issues of a specific project, while still focusing on those things that make the building unique for those with autism.

The location of the Koa Ridge ATRSC drove many design decisions, and this points to the important role that the site plays in project development. The fact that the project is located on the same campus as a hospital meant that ancillary services, such as lab and x-ray, could be utilized there, and therefore not included in the ATRSC itself. The ease of clinical referrals and access to support services is critical information that must be ascertained at the onset of the design process.

Finally, it is important during the design process of any ATRSC to keep in mind the underlying principle set forth in this report – “a holistic, family-centered approach to

the treatment of autism.” The design of ATRSCs should focus on the family’s needs, and offer comprehensive services for them to choose from. It is important that the client embrace this philosophy, since they are the ones that will be providing the services.

The concept of modularity was a primary goal from the onset of this research project, and is reflected in the design of the Koa Ridge ATRSC. The idea was to allow programmatic needs to be met by choosing appropriate modules for further development. A by-product of this concept is that it lends itself to future expansion. If the prevalence of autism continues its meteoric rise, the increase in the student population will require facilities to continuously grow and potentially add new services. Adding an additional classroom module, or a new service not initially programmed, is facilitated by the modular concept.

Although ATRSCs are not proposed as research facilities per se, they nonetheless by their very existence could serve as the basis for research efforts by others, essentially serving as a “living laboratory” for those who study autism spectrum disorders. While not a primary goal of the Koa Ridge ATRSC, the design does provide several observation rooms that could be used by researchers, as well as ample space (both inside and outside) for observing the students in their daily activities. Perhaps other projects could attempt to accommodate observers in a way that is less visible to the students. If an actual research component is desired in a given facility, this could also be addressed by the modular concept, through the development of a “research module” in the Planning and Programming Criteria Guide.

Perhaps it is fortunate that the conceptual design project developed for this report is located here in Hawaii, because there is a definite need here for just such a facility, as was pointed out in the *Report to the Twenty-Fifth Legislature, State of Hawai'i, 2009*, noted in Chapter Two. The establishment of an ATRSC here on Oahu would give local families a place they could turn to, in order to meet all of their autism-related needs.

A diagnosis of autism has many far-reaching, life-long implications, for both the individual and the family. And although there is no cure for autism, it is treatable, and many children today are recovering to the point where they lose their diagnosis. Many can go on to lead independent and productive lives as adults. Effective intervention is the key. In that regard, it is hoped that the establishment of comprehensive Autism Treatment, Resource, and Support Centers, as outlined in this report, will provide the appropriate environments where that intervention can take place.

## **Appendix A**

### **Autism Organizations**

**Association for Science in Autism  
Treatment**

P.O. Box 188  
Crosswicks, NJ 08515-0188  
[www.asatonline.org](http://www.asatonline.org)

5455 Wilshire Boulevard  
Suite 2250  
Los Angeles, CA 90036  
(323) 549-0500

[www.autismspeaks.org](http://www.autismspeaks.org)

**Autism National Committee**

3 Bedford Green  
South Burlington, VT 05403  
[www.autcom.org](http://www.autcom.org)

**Center for Autism and Related  
Disorders**

19019 Ventura Blvd. Suite 300  
Tarzana CA, 91356  
(818) 345-2345  
[www.centerforautism.com](http://www.centerforautism.com)

**Autism Society**

(Formerly Autism Society of America)  
4340 East-West Hwy, Suite 350  
Bethesda, Maryland 20814  
(301) 657-0881 or 1-800-3AUTISM  
(1-800-328-8476)  
[www.autism-society.org](http://www.autism-society.org)

**Families for Early Autism Treatment**

P. O. Box 255722  
Sacramento, CA 95865-5722  
(916) 303-7405  
[www.feat.org](http://www.feat.org)

**Autism Research Institute**

4182 Adams Avenue  
San Diego, CA 92116  
(866) 366-3361  
[www.autism.com](http://www.autism.com)

**First Signs**

P.O. Box 358  
Merrimac, MA 01860  
(978) 346-4380  
[www.firstsigns.org](http://www.firstsigns.org)

**Autism Speaks**

1 East 33rd Street  
4th Floor  
New York, NY 10016  
(212) 252-8584

**Generation Rescue**

[www.generationrescue.org](http://www.generationrescue.org)

1060 State Road, 2nd Floor  
Princeton, NJ 08540  
(609) 228-7310

**Organization for Autism Research**

2000 North 14th Street, Suite 710,  
Arlington, VA 22201  
(703)-243-9710  
[www.researchautism.org](http://www.researchautism.org)

**National Autism Association**

1330 W. Schatz Lane  
Nixa, MO 65714  
(877) NAA-AUTISM  
(877) 622-2884  
[www.nationalautismassociation.org](http://www.nationalautismassociation.org)

**Rethink Autism**

[www.rethinkautism.com](http://www.rethinkautism.com)

**Southwest Autism Research &  
Resource Center**

300 N. 18th Street  
Phoenix, AZ 85006  
(602) 340-8717  
[www.autismcenter.org](http://www.autismcenter.org)

**Talk About Curing Autism (TACA)**

TACA Foundation Office  
3070 Bristol Street, Suite 340  
Costa Mesa, CA 92626  
(949) 640-4401  
[www.tacanow.org](http://www.tacanow.org)

## **Appendix B**

### **Hawaii Resource Guide**

#### **ABA/AVB Providers**

##### **ACES Hawaii**

94-849 Lumi'aina St., Suite 201  
Waipahu, HI 96797  
(808) 294-7050  
[www.acesautism.com](http://www.acesautism.com)

##### **All About Behavior**

94-347 Hokuahiahi St., #318  
Mililani, HI 96789  
(808) 741-2232

##### **Autism Behavior Consulting Group**

PO BOX 1162  
Waialua, HI 96791  
(808) 277-7736  
[www.AutismBehaviorConsulting.com](http://www.AutismBehaviorConsulting.com)

##### **Autism Training Solutions**

2800 Woodlawn Drive  
Honolulu, HI 96822  
(866) 966-9452  
[www.autismtrainingsolutions.com](http://www.autismtrainingsolutions.com)

##### **Behavior Analysis No Ka Oi, LLC**

1259 South Beretania Street, Suite 4  
Honolulu, HI 96814  
(808) 591-1173  
[www.hawaiibehavioranalysis.com](http://www.hawaiibehavioranalysis.com)

##### **Pacific Autism Center**

670 Auahi Street  
Suite A-6  
Honolulu, HI 96813  
(808) 523-8188  
[www.pacificautismcenter.com](http://www.pacificautismcenter.com)

#### **DIR/Floortime Providers**

##### **LD & ADHD Center of Hawaii**

Dr. Leslie Woods  
1110 University Ave., Suite 504  
Honolulu, HI 96826-1545  
(808) 955-4775  
[Ldcenterofhawaii.com](http://Ldcenterofhawaii.com)

##### **Kiegan Blake & Associates**

P.O. Box 1379  
Puunene, HI 96784  
(808) 873-7700

##### **Amanda Grainger**

95 Mahalani Street, Ste. 19A  
Wailuku, HI 96793  
(808) 244-7467

#### **RDI Services**

##### **Lauren Wilson, MSW**

(808) 264-3007  
[www.laurenwilson.net](http://www.laurenwilson.net)

#### **Other Schools**

##### **Hau'oli Na'Keiki Program**

91-1841 Ft. Weaver Road  
Ewa Beach, HI 96706  
(808) 440-8319

**Horizon Academy Maui**

740 Haiku Road  
Haiku, HI 96708  
(808) 575-9180

**Loveland Academy**

1506 Piikoi Street  
Honolulu, HI 96822  
(808) 524-4243  
[www.lovelandacademyhawaii.com](http://www.lovelandacademyhawaii.com)

**Variety School of Hawaii**

710 Palekaua Street  
Honolulu, HI 96816  
(808) 732-2835  
[www.variety-school.org](http://www.variety-school.org)

**Speech/OT/PT Providers****Harris Therapy, Inc. (ST/OT/PT)**

725 Kapiolani Blvd., #C124  
Honolulu, HI 96813  
(808) 596-4650

**Island Talk (ST)**

(808) 371-1533

**Oahu Speech and Pathology****Consultants (ST)**

1010 S. King Street, B-6  
Honolulu, HI 96814  
(808) 593-0030  
[www.oahuspeech.com](http://www.oahuspeech.com)

**Oahu Therapy Clinic (PT)**

1314 S. King Street, #319  
Honolulu, HI 96813  
(808) 596-4656

**Sprouts Therapy (OT)**

P.O. Box 1077  
66-425 Paalaa Road  
Haleiwa, HI 96712  
(858) 248-7824  
[www.sproutstherapy4kids.com](http://www.sproutstherapy4kids.com)

**Yoshimoto Physical Therapy**

600 Kapiolani Blvd., #208  
Honolulu, HI 96813  
(808) 528-5300

**Early Intervention****Early Intervention - Legal Rights and Procedures**

[www.hawaii.gov/health/family-child-health/eis/regulations.html](http://www.hawaii.gov/health/family-child-health/eis/regulations.html)

**Early Intervention Section****Department of Health**

1350 South King Street #200  
Honolulu, HI 96814  
(808) 594-0006  
[hawaii.gov/health/family-child-health/eis/index.html](http://hawaii.gov/health/family-child-health/eis/index.html)

**Easter Seals Hawaii - Disability Services**

710 Green Street  
Honolulu, HI 96813  
(808) 536-1015  
(800) 241-7450  
[hawaii.easterseals.com](http://hawaii.easterseals.com)

**Child Psychologists****Dr. Jan FitzGerald, PhD**

Honolulu, HI 96815  
(808) 386-8630

**Dr. Karen Tyson, PsyD.**  
LD & ADHD Center of Hawaii  
1110 University Ave., Suite 504  
Honolulu, HI 96826-1545  
(808) 955-4775

*Developmental Pediatricians*

**Dr. Curtis Takemoto-Gentile**  
2658 South King Street  
Honolulu, HI 96826-3243  
(808) 955-1544  
[www.doctorctg.org](http://www.doctorctg.org)

**Dr. Jeffrey K. Okamoto**  
1319 Punahou St., # 7  
Honolulu, HI 96826  
(808) 949-2304

*Neurologists*

**Dr. Keith Abe**  
1319 Punahou Street, #999  
Honolulu, HI 96826  
(808) 947-1402

**Dr. Gregory Yim**  
1319 Punahou Street, #1000  
Honolulu, HI 96826  
(808) 946-4474

*Dentists*

**Dr. Lynn Fujimoto**  
Pediatric Dentistry Association  
850 Kamehameha Hwy., #215  
Pearl City, HI 96782  
(808) 456-4555

**Dr. Norman Chun**  
47-693 Alawiki Street  
Kaneohe, HI 96744  
(808) 239-2325

*Psychologists (Educational Assessments/  
Diagnosis/Behavioral)*

**Dr. Colin Denney**  
4211 Waialae Ave., Ste. 507  
Honolulu, HI 96816  
(808) 737-4300

**The LD&ADHD Center of Hawaii**  
1110 University Ave., #504  
Honolulu, HI 96826  
(808) 955-4775

**Melinda Kohr, Ph.D.**  
2875 S. King Street, #203  
Honolulu, HI 96826

**Dr. Catherine Kritz, Ph.D.**  
101 Kuualala Street  
Kailua, HI 96734  
(808) 263-8355

**Dr. Gaby Toloza**  
(808) 348-5056

*Music Therapy*

**Sounding Joy Music Therapy, Inc.**  
1314 S King St # 711  
Honolulu, HI 96814-1942  
(808) 593-2620  
[www.soundingjoymt.org](http://www.soundingjoymt.org)



Hyperbaric Oxygen Therapy

**Hyperbaric Medicine Center**

275 Puuhale Road  
Honolulu, HI 96819  
(808) 851-7030 96  
www.hyperbaricmedicinecenter.com

Organic Grocery Stores

**Whole Foods**

4211 Waialae Avenue #2000  
Honolulu, HI 96816  
(808) 738-0820  
Wholefoodsmarket.com

**Down to Earth**

2525 South King Street  
Honolulu, HI 96826-3154  
(808) 947-7678

98-131 Kaonohi Street  
Aiea, HI 96701-4704  
(808) 488-1375

201 Hamakua Drive  
Kailua, HI 96734  
(808) 262-3838

downtoearth.org

**Vim N Vigor**

Ala Moana Center  
1450 Ala Moana Blvd #1014  
Honolulu, HI 96814  
(808) 955-3600  
vimnvigor.com

**The Source Natural Foods**

32 Kainehe Street  
Kailua, HI 96734  
(808) 262-5604  
www.thesourcenatural.com

**Kokua Market**

2643 South King Street  
Honolulu, HI 96826  
(808) 941-1922  
www.kokua.coop

**Umeke Market**

4400 Kalanianaʻole Hwy.  
Kahala, HI 96821  
(808) 739-2900  
www.umekemarket.com

**Kales**

377 Keahole Street, #A1  
Honolulu, HI 96825  
(808) 396-6993  
Kalesnaturalfoods.com

Compounding Pharmacies

**Medical Center Pharmacy**

99-115 Aiea Heights Dr #301  
Aiea, Hawaii 96701  
(808) 487-9988

**Malama Pharmacy (Big Island)**

81-6629 Malamhoa Highway  
Kealahou, HI 96750  
(808) 324-6888

### Labs

#### **Clinical Labs of Hawaii**

Kapiolani Medical center  
1319 Punahou Street, basement  
Honolulu, HI 96826  
(808) 983-8569

### Legal Resources

#### **Davis Levin Livingston Attorneys at Law**

400 Davis Levin Livingston Place  
851 Fort Street  
Honolulu, HI 96813  
(808) 524-7500  
[www.davislevin.com](http://www.davislevin.com)

#### **Fonseca & Ching Attorneys at Law**

841 Bishop Street  
Suite 2201  
Honolulu, HI 96813  
(808) 521-1141

#### **Keith Peck, Esq.**

3360 Kamaaina Place  
Honolulu, HI 96817  
(808) 384-7325  
[www.spedlawcenter.com](http://www.spedlawcenter.com)

#### **Carl Varady, Esq.**

1001 Bishop Street, Ste. 2870  
Honolulu, HI 96813  
(808) 523-8447  
[www.varadylaw.com](http://www.varadylaw.com)

#### **Eric Seitz, Esq.**

820 Mililani Street, #714  
Honolulu, HI 96813  
(808) 533-7434

#### **Irene E. Vasey, Attorney at Law**

A Law Corporation  
Pali Palms Plaza  
970 North Kalaheo Ave., # A216  
Kailua, HI 96734  
(808) 254-0414

#### **Hawaii Disability Rights Center**

900 Fort Street Mall, Ste. 1040  
Honolulu, HI 96813  
(808) 949-2922  
[www.hawaiidisabilityrights.com](http://www.hawaiidisabilityrights.com)

### Support Groups

#### **Autism Society of Hawaii**

1100 Alakea Street  
Honolulu, HI 96813  
(808) 288-0122

#### **TACA Hawaii**

Kaimuki Christian Church  
(Meets in the 2nd Floor Sanctuary)  
1117 Koko Head Ave.  
Honolulu, HI 96816  
(808) 230-8431  
<http://www.tacanow.org/local-chapters/hawaii/>

#### **The Beautiful Son Foundation**

320 Po'opo'o Place  
Kailua, HI 96734  
(808) 265-5519  
[www.beautifulsonfoundation.org](http://www.beautifulsonfoundation.org)

#### **Hawaii Families as Allies**

99-209 Moanalua Road  
Aiea, HI 96701  
(808) 487-8785

**Tripler Army Medical Center**  
(Military Families)  
Alan Gamble, SW  
1 Jarret White Road  
Honolulu, HI 96859  
(808) 433-6205

**Easter Seals**  
710 Green Street  
Honolulu, HI 96813  
(808) 536-1015  
[hawaii.easterseals.com](http://hawaii.easterseals.com)

**Autism Bridges Maui**  
P.O. Box 387  
Puunene, HI 96784  
(808) 344-4148  
[www.autismbridgesmaui.org](http://www.autismbridgesmaui.org)

**Barber Shop**

**Pigtails and Crewcuts**  
930 Valkenburgh St # 106  
Honolulu, HI 96818-3915  
(808) 422-4300  
[www.pigtailsandcrewcuts.com](http://www.pigtailsandcrewcuts.com)

**Other State Resources**

**Preschool - Legal Rights and Procedures**  
[www.doe.k12.hi.us/specialeducation/  
ProceduralSafeguards.htm](http://www.doe.k12.hi.us/specialeducation/ProceduralSafeguards.htm)

**Transition from Preschool to School  
Age Services**

**Preschool Special Education**  
Special Education Services Branch  
Student Support & Special Education  
Sections  
637 18th Avenue, Building C  
Honolulu, HI 96816  
(808) 733-4838  
[www.doe.k12.hi.us/specialeducation/  
preschoolsped.htm](http://www.doe.k12.hi.us/specialeducation/preschoolsped.htm)

**Special Education Services Branch: Is it  
for your Child?**

**Hawaii Department of Education**  
637 18th Avenue  
Room C-102  
Honolulu, HI 96816  
(808) 733-4400  
[doe.k12.hi.us/specialeducation/  
spedisitforyourchild.htm](http://doe.k12.hi.us/specialeducation/spedisitforyourchild.htm)

**Special Education: Your Student's  
Rights**

**Hawaii Department of Education**  
(808) 733-4400  
[www.doe.k12.hi.us/specialeducation/  
index\\_rights.htm](http://www.doe.k12.hi.us/specialeducation/index_rights.htm)

**Transition from School Age Services to  
Adult Services**

**Coordinator for Transition Services**  
Hawaii Department of Education  
637 18th Avenue  
Room C-102  
Honolulu, HI 96816  
(808) 733-4832  
[sssb.k12.hi.us](http://sssb.k12.hi.us)  
[doe.k12.hi.us/specialeducation/  
SpEdhandbook/secondarytransition.htm](http://doe.k12.hi.us/specialeducation/SpEdhandbook/secondarytransition.htm)

**Developmental Disabilities Division  
Department of Health**

1250 Punchbowl Street, #463  
Honolulu, HI 96813  
(808) 586-5840  
[hawaii.gov/health/disability-services/developmental/index.html](http://hawaii.gov/health/disability-services/developmental/index.html)

**Learning Disabilities Association of  
Hawaii**

245 North Kukui Street, Ste. 205  
Honolulu, HI 96817  
(808) 536-9684  
[www.ldahawaii.org](http://www.ldahawaii.org)

**Special Parent Information Network  
(SPIN)**

919 Ala Moana Blvd., Room 101  
Honolulu, HI 96814  
(808) 586-8126  
[www.spinhawaii.org](http://www.spinhawaii.org)

*Activities*

**Access Surf**

(808) 236-4200  
[www.accesssurf.com](http://www.accesssurf.com)

**Manawaleʻa Riding Center**

41-170A Waikupanaha Street  
Waimanalo, HI 96795  
(808) 352-1523  
[www.manawalea.org](http://www.manawalea.org)

**Special Olympics Hawaii**

1833 Kalakaua Avenue, Suite #100  
Honolulu, HI 96815  
(808) 943-8808  
[www.specialolympicshawaii.org](http://www.specialolympicshawaii.org)

## **Appendix C**

### **Design Firms with Experience Designing for Autism**

#### **Dixon Architecture**

1560 Taylor Avenue North  
Grand Rapids, MI 49505  
(616) 742-0018  
[www.dixonarch.com](http://www.dixonarch.com)

#### **Fletcher-Thompson, Inc.**

Three Corporate Drive  
Suite 500  
Shelton, CT 06484  
(203) 225-6500  
[www.fletcherthompson.com](http://www.fletcherthompson.com)

#### **GA Architects**

12A Shaftesbury Centre  
85 Barlby Road  
London, W10 6BN  
44(0) 20-8960-4418  
[www.autism-architects.com](http://www.autism-architects.com)

#### **Hill Studio**

120 W. Campbell Avenue  
Roanoke, Virginia 24011  
(540) 342-5263  
[www.hillstudio.com](http://www.hillstudio.com)

#### **Purple Cherry Architects**

1 Melvin Ave # 3  
Annapolis, MD 21401-1215  
(410) 990-1700  
[www.purplecherry.com](http://www.purplecherry.com)

#### **SHW Group**

1160 East Commerce Street  
Suite 200  
San Antonio, Texas 78205  
(210) 223-9588  
[www.shwgroup.com](http://www.shwgroup.com)

#### **Simon Humphreys, RIBA, FRSA**

Bridge Studios  
Hammersmith Bridge  
London  
W6 9DA  
020-8741-4381

#### **USA Architects Planners + Interior Designers**

20 North Doughty Avenue  
Somerville, NJ 08876  
(908) 722-2300

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